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SECTIONS AND BRANCHES VITALIZE SOCIETY MEMBERSHIP

By H. S. ROGERS,

Vice-President of the Society

The work done in the Sections and Branches of the Society offers a great opportunity to the entire membership for personal and intimate contacts with the group thought upon the development of and contributions to engineering education. From one tenth to one seventh of the membership of the Society are alone able to attend the Convention and summer schools, but approximately sixty-two per cent of the Society members belong to Sections and Branches, and about eight per cent of them are now in areas where Sections are being organized. These units of the Society afford, therefore, an excellent opportunity for a wide development of the engineering teaching profession and the advancement and improvement of engineering education.

With a large portion of the engineering teachers enrolled in the Society there is a definite obligation and responsibility to take the leadership in the solution of those educational problems now demanding attention. Some of these are of immediate and utmost significance to all engineering teachers. One of the most important problems is the classification of engineering schools. Any classification will exercise definite control upon the curricula, equipment, and instructional standards. The problem is at present being studied by the National Council of State Boards of Engineering Examiners, but is also of fundamental interest to the Society for the Promotion of Engineering Education. Another problem is the proposal of comprehensive examinations for the classification of graduates, perhaps in contradistinction to the classification of schools. A third problem is the reorganization and the standardization of professional degrees with their influence upon professional status and prestige.

In the present progress of economic adjustment few schools will be able to escape some form of survey or reorganization. How seldom it is that engineering educators participate in state-wide surveys of education and in the recommendations for coördinated programs, yet what group is better qualified to study the entire field of physical science. The Sections and Branches offer a great opportunity for the study of engineering education and its relation-

ship to the whole program of higher education. Surely, if engineering education is to take a recognized and coördinate place in the program of higher education, it must develop and formulate a sound and comprehensive philosophy and an adequate theory to support its practice of pedagogy. No field of education has ever had a greater wealth of facts from which to evolve these than that made available by the recent reports of the Board of Investigation and Coördination.

The scope of the Society work is so broad that it touches each member and every teacher. Its committees on Comprehensive Examinations, Relationship of the Society to Engineering Societies, Classification of Engineering Colleges, Junior Colleges, Graduate Work, and various courses of instruction such as Mathematics, English, and Engineering Problems afford opportunity for study and exchange of views. Its divisions of Engineering Drawing, Mechanics, and physics, have been the clearing house and exchange for the best thought of engineering teachers. Its Board of Investigation and Coördination has made, perhaps, the finest study of higher education ever completed. Its summer schools have given inspiration and contacts to many earnest members. The Society has touched all fields, and its contributions and studies are unparalleled in the field of higher education. The associations with its active membership are a great source of inspiration.

With the pressure of current problems for solution, with the record of achievements behind the Society, with the large membership already enrolled in Sections and Branches, with the organization of new sections on the Pacific Coast and in the Rocky Mountains, with the prospect of others in the South and Middle West, the outlook for interest and activity during the current year in these divisions is exceedingly bright and encouraging.

COLLEGE NOTES

Antioch College.—An interesting and valuable department of Antioch College is the Antioch Industrial Research Institute, Incorporated, located with the College at Yellow Springs, Ohio.

The Institute was incorporated during the summer of 1930 for the purpose of handling technical research problems of practical and profitable nature. It is well equipped with apparatus and facilities for handling ore problems, metal alloys, mechanical and electrical devices, and has been engaged upon a number of this sort of projects with satisfactory results.

It is hoped that the Institute will ultimately become a source of income to the College, and the inter-relation between the College and the Institute in both personnel and facilities is of great value to both.

University of Arkansas.—Professor J. T. Strate of the Mechanical Engineering Department resigned to accept the position as Head of the Department of Mechanical Engineering at South Dakota State College, Brookings, S. D. Mr. A. G. Holmes, Jr., is taking the place of Professor Strate.

There has been a small reduction in the total enrollment in the engineering college. The freshmen and sophomore classes have been reduced but the junior and senior classes are larger than normal, making the net loss very small.

The Arkansas-Oklahoma Section S. P. E. E. is planning a fall meeting at Oklahoma University. Professor J. E. Brooks of Oklahoma University is president and Professor G. P. Stocker of Arkansas University is chairman of the program committee.

Armour Institute.—*Promotions:* Philip C. Huntly from Associate Professor of Experimental Engineering to Professor of Materials Testing; Walter Hendricks from Associate Professor to Professor of English; Donald E. Richardson from Assistant Professor to Associate Professor of Electrical Measurements; John J. Schommer from Assistant Professor to Associate Professor of Industrial Chemistry; Herbert Ensz from Assistant Professor to Associate Professor of Civil Engineering; Joel M. Jacobson from Instructor to Assistant Professor of Civil Engineering; Walter A. Spencer from Instructor to Assistant Professor of Mathematics.

New Appointments: Harold L. Norway, Instructor in Fire Protection Engineering; Robert H. Engle, Assistant Professor of Economics; Ernest K. Eugene, Instructor in Civil Engineering, John V. Lizars, Lecturer in Business Law.

University of California.—W. A. Hillebrand, who has been closely identified with the light and power industry of the United States through his association with the Ohio Insulator Company as electrical engineer since 1919, was appointed Professor of Electrical Engineering at Berkeley, beginning July 1, 1932. Prior to his affiliation with the Ohio Insulator Company, Professor Hillebrand was Associate Professor of Electrical Engineering at Stanford University, and later in charge of the Department of Electrical Engineering at Oregon State College. At present he is engaged upon research in connection with the problem of the effect of the salt fogs of the California coastal region upon transmission line insulation.

Mr. C. F. Dalziel, formerly of the Central Station Engineering Department, General Electric Company, Schenectady, New York, and later relay protective engineer for the San Diego Consolidated Gas and Electric Company, has been appointed an Associate in the Department of Electrical Engineering at Berkeley.

The new communications laboratories in the Department of Electrical Engineering at Berkeley are now in full operation. Five officers from the U. S. Navy, specializing in radio, are taking courses offered in electrical communications. A new laboratory course in electrical transients is being offered for the first time this year to graduate students in electric power or electrical communications engineering.

Professor B. F. Raber is on sabbatical leave and his place is being taken by Mr. Wm. H. Foxwell, Graduate of Mechanical Engineering from the University of Nebraska in 1921, member of Sigma Xi, A. S. M. E., Sigma Tau.

Mr. George H. Hickox. Graduate of University of Iowa, 1925, M.S., University of Iowa, 1926.

Charles R. Dodson. Mr. Dodson is a graduate of the University of Maryland with the class of 1930. He received his Master of Science degree from the Massachusetts Institute of Technology on the "basis of research conducted in coöperation with the General Electrical Company."

In the department of mechanical engineering, under the supervision of Professors Boelter, O'Brien, Howe and Vogt, a number of new assistants are doing some excellent work in the experimental laboratories.

A. V. Hershey, graduate in chemistry, is working in thermodynamics, particularly as applied to refrigeration and calorimetry.

W. P. Berggren is specializing in dynamical experiments.

L. A. Ledgett is conducting experiments in dynamics and aeronautics.

V. H. Cherry is a specialist in heat transfer, supplemented with work in power.

A. A. Bauer and R. L. Stoker are doing much of the work in fluid mechanics or fluid flow.

M. Asimow is active in machine shop production. He has been conducting some interesting experiments in drawing small cups from steel plates. Oscillograph records of the drawing conditions have been made by designed apparatus built in the shops.

All these young men are graduates of the University during the last two or three years.

Enrollment in the College of Engineering, comprising the Departments of Civil, Electrical and Mechanical Engineering, is 1026 as compared with 843 in 1931–2. Of this increase the largest numbers occur in the junior, senior and graduate years. The graduate enrollment is double that of last year.

The total enrollment in the University is greater than ever before. On the Berkeley campus alone there are now 11,830 as compared with 11,222 last year. At Los Angeles there are now 6472 as compared with 6106 last year. The total enrollment in all branches, Berkeley, Los Angeles, San Francisco and Davis, is 19,348, where last year there were 18,342.

The University has undertaken to make savings of $300,000 for the current year and to return that sum to the State Treasury. Part of this amount will come from voluntary reductions in salaries above $2000. The contributions are to be made in installments covering nine months of the academic year.

Reduced income compelled retrenchments in the purchase of laboratory equipment, in consequence of which only relatively small expenditures have been made. Some changes in the arrangements of the electrical, heat treating and welding, machine shop and hydraulic laboratories have been made to better utilize the existing space.

The materials testing laboratory of the Civil Engineering Department is very active, particularly in connection with the studies being made in concretes for Hoover Dam and other projects. Under the direction of Prof. G. E. Troxell a considerable number of tests have been made in the four-million pound Southwark testing machine completed during the summer. Many of the tests were made in the presence of members of the engineering societies. Tests to destruction of various types and parts of oil well tools, for one of the prominent manufacturers in the State, have been of very great interest. They will result in some minor changes in design, although all parts tested were broken at values far above their rated capacities.

The facilities for long-continued studies of a very wide variety of cements, concretes, aggregates, methods of mixing, heating of concrete in large masses, curing conditions, etc., are remarkably complete in this laboratory, and are said to be unsurpassed by any other university. These studies are principally under the direction of Prof. R. E. Davis.

Other studies of the San Francisco-Oakland suspension bridge, including the construction and testing of three models to a scale of 1:100, have been carried out under the supervision of Dean Derleth.

Researches under the direction of Prof. M. P. O'Brien are going forward on various types of hydraulic structures, syphons, stream channels, beach erosion, etc.

Apparatus for class room demonstration in simple form, and more elaborate apparatus for laboratory use in photo-elastic studies of materials under stress, have been made to the designs of Mr. R. G. Minarik. He is a graduate of Case School of Applied Science, took his M.S. degree at Yale where he also did some work in instruction, and carried on photo-elastic studies under the supervision of Prof. E. O. Waters.

A wind tunnel of the Gottingen type, horizontal, with open throat and closed return passages, was constructed last summer to the design of Mr. Coby Lorenzen, graduate of 1929. Mr. Lorenzen spent two years at N. A. C. A., Langley Field, Va., on wind tunnel work. The tunnel here is of metal construction throughout, including adjustable metal guide vanes. The test chamber is three feet square, in which an air speed of eighty-five miles per hour is attained, with a four-bladed propeller driven by a 25-horsepower motor. Calibration studies and adjustments are under way in preparation for future tests.

Air conditioning research being conducted by Mr. D. O. Rusk is under the joint supervision of Dr. B. M. Woods and Mr. Foxwell.

Research studies for the Pacific Coast Gas Association Fellowship are being carried on by Mr. G. R. MacPherson. His present work is on various types of burners.

Professor C. L. Cory, formerly Dean of the College of Mechanics, has been retired because of ill health.

Prof. J. N. LeConte has resumed his teaching duties after a very enjoyable year spent in touring Europe with Mrs. LeConte. Their principal travels were in France and Italy, in their own car, found to be the ideal method for visiting the sections less frequented by tourists.

Prof. B. F. Raber and Mrs. Raber are touring Europe during this academic year. Prof. Raber is making a study of many of the large power plants.

Prof. A. C. Alvarez of the Civil Engineering Department, and Mrs. Alvarez are also in Europe for the year.

Mr. J. E. Carson, M.S., Purdue, has been appointed Instructor in Civil Engineering and Surveying, as an assistant to Prof. F. S. Foote.

The **California Institute of Technology** is supported entirely by endowments and contributions made by individuals interested in providing a high grade type of college for men, where the best type of undergraduate and graduate instruction is provided and where research work in science, mathematics and engineering is carried on in an intensive manner.

An unusual feature of the Institute is the relatively large amount of time, approximately 20 per cent, devoted to courses in humanities. Undergraduate and graduate courses are provided in biology, chemistry, engineering (civil, chemical, electrical and mechanical), geology, mathematics and physics, also graduate courses are provided in aeronautics and astrophysics. The latter work at the present time is housed in three of the newer buildings on the campus, one of which is a building containing research rooms and offices, the second is an up to date machine shop for the construction of all the appurtenances and supplementary apparatus which will be needed in connection with the 200-inch telescope, most of the parts for which will also be built in this shop. The third building of the group is the optical shop, in which the disc for the 200-inch telescope and many other lenses and reflectors will be ground.

Another recent building is the W. K. Kellogg Radiation Laboratory, in which is housed the special 2 million volt X-Ray equipment. In this building, which contains research rooms and laboratories in addition to the X-Ray equipment, much X-Ray work relating to problems in physics and in therapeutics is being done, under the direction of Dr. C. C. Lauritsen and Dr. Seeley W. Mudd.

Probably the most striking bit of news is that relating to the return of Einstein for his third visit to the Institute. New men who will be seen on the campus this year include, Dr. Peter Debye, Professor of Physics at the University of Leipzig, Germany; Dr. J. B. S. Haldane, Professor of Physiology at the Royal Institution of London and Reader in Biochemistry in Cambridge, visiting lecturers, and George E. MacGinitie, formerly of the Hopkins Marine Station of Stanford University and Dr. Fritz W. Went, formerly Director of the Vreemdalingen Laboratory of Tjibods, Java, who have become permanently associated with the Institute staff as members of the Biology Department.

The student body is slightly larger than last year, the total enrollment at the present time being 780, there being a noticeable increase in the enrollment of graduate students and in the group con-

sisting of National and International Research Fellows, Rockefeller Foundation Fellows, Commonwealth Fund Fellows and Research Fellows of the Institute.

During recent months honors have been conferred upon faculty members for work done, two of the most notable of which are the Gold Medal of Honor of the Roosevelt Foundation, which was conferred upon Dr. Millikan on October 27, 1932, and the Richards Medal of the American Chemical Society, which was conferred upon Dr. Arthur A. Noyes last spring.

Carnegie Institute of Technology.—With several important changes in personnel and curricula, the College of Engineering of the Carnegie Institute of Technology has begun its session with an enrollment slightly larger than last year. The total registration in the Institute was slightly less than last year. Enrollment in the night school showed a large decrease.

Dr. Webster N. Jones, formerly with the Goodrich Rubber Company at Akron, was appointed during the summer by President Baker to succeed Mr. William E. Mott as director of the College of Engineering. Director Mott retired after 23 years on the faculty. Another member of the engineering staff, Professor George H. Follows, of the department of commercial engineering, also retired at the end of the session. He was a member of the original faculty of the institution, appointed in 1905.

During the summer, Dr. Robert F. Mehl, of the American Rolling Mill Company, Middletown, Ohio, was appointed director of the bureau of metallurgical research. New laboratories have been built in Engineering Hall for this division. Dr. Mehl has added two members to the staff. They are Dr. Charles S. Barrett, formerly with the Naval Research Laboratory, Washington, and Dr. Dana W. Smith, who was associated with Dr. Mehl at the Naval Laboratory where the latter worked before joining the American Rolling Mill Company.

Two departments in the College of Industries have been consolidated with existing courses in the College of Engineering. The department of works management of the Industries College has been combined with commercial engineering. Dr. Lawrence R. Guild, of the department of economics, was appointed to head the new division, succeeding Dr. Walter F. Rittman. The department of building construction has been combined with the departments of civil and mechanical engineering in the College of Engineering. The sophomore class of this year will be the first to be affected by the change.

Appointments for the year include Henry B. Moore, instructor in commercial engineering; Dr. Grover R. Greenslade, instructor

in physics; John Boyd, instructor in mechanics, transferred from the department of drawing and descriptive geometry.

The following fellows have received appointments; Dr. Alan R. Albright, Dr. Guenther Von Elbe, and Philip H. Dewey, coal research; Arthur C. Barnhart, and Herbert S. Strickler, mining; Henry L. Bunker, Jr., mechanical engineering; Frederick R. Millhiser, chemistry; Richard H. Herter, James H. McAteer, Jr., and William J. Svirbely, chemical engineering teaching fellows; Wilson H. Power, Fred B. Stitt, and John M. Wege, teaching fellows in night school chemical engineering; and Miles K. Smith, teaching fellow in metallurgy.

Dr. Francis M. Walters, Jr., of the bureau of metallurgical research, was awarded the 1932 Howe Medal by the American Society for Steel Treating for his paper on "The Alloys of Iron, Manganese and Carbon." Honorable mention was given Dr. John F. Eckel and Maxwell Gensamer who assisted Dr. Walters with the study.

Under the direction of Dr. H. H. Lowry, the staff of the Coal Research Laboratory has been increased to 19 members. Thirteen men are directly engaged in technical research. Three new laboratories have been added during the summer. Work is now in progress on twelve problems, all but two of which are related to a study of the mechanism of thermal decomposition of coal.

The Catholic University of America.—The continual growth of the University led the Administration two years ago to reorganize the various departments into a new system of schools. The creation of a School of Engineering, a Graduate School, and a College of Arts and Sciences constituted the major changes. The formation of the School of Engineering as a distinctly professional unit was the result of the consolidation of various technical departments. This consolidation brought about the establishment, within the national center of Catholic education, of a separate engineering school with a faculty composed entirely of laymen each of whom has had practical experience in his field and therefore brings to his classroom and laboratory a broader view and a deeper insight into his subject and its applications.

Instruction in engineering subjects is not a new departure at this University. On the contrary, in the former School of Sciences which has now been succeeded by the School of Engineering, standard courses have for many years been offered and the University's graduates are to be found among the distinguished scientists and engineers of the country.

Since the reorganization considerable development of the School of Engineering has taken place, namely, increases in the teaching staff, purchase of new equipment and the expansion of library facilities. It is believed, therefore, that the University is in a better posi-

tion than ever before to train young men for careers in the engineering profession.

The demand for college training in Aeronautical Engineering has led to the establishment of a four years professional course in this branch. As a matter of fact, the Catholic University has long been recognized as one of the pioneer institutions in the field of aeronautical research. The first wind tunnel in the United States was built and operated on the campus by Doctor Albert Zahm, then a member of the University Faculty. These very early researches, which are still going on, have to do with the effect of air, at varying speeds and pressures, upon moving planes and other bodies. They have brought world wide recognition to Professor Louis H. Crook who, as a member of the Faculty, is continuing this work.

It has also been found, quite recently, that certain college graduates of non-professional status are calling for such an engineering course as will professionalize their previous training. It is felt that such students can utilize their education as a foundation upon which to build a satisfactory course in engineering. To meet this situation the School of Engineering is now offering a two year course leading to the degree of Bachelor of Engineering.

These additional courses enable the School to offer nine different programs of study, each leading to a degree in each of the following fields: Aeronautical, Architectural, Chemical, Civil, Electrical, Mechanical and General Engineering; also Architecture and Chemistry.

Care has been taken to incorporate in each of these programs of study such non-engineering subjects as will make available to the student the cultural advantages as well as the professional training of the University.

Clemson College.—About two years ago a professor in agriculture told Professor D. H. Shenk that he used a kindergarten method to incite better scholarship among his students. He awarded seats in the class room on the basis of the last month's grades. The poorest student at one end of the front row and the rest arranged in order of their grades. The system was adopted. It worked. The system has spread in the Mechanical Engineering school until every man teaching Mechanical Engineering at Clemson now uses it.

We find we have better attention from the poorer students on account of shame for their grades and less opportunity for distraction. There is less dishonesty. Those having most temptation to be dishonest are in the hardest position to crib undetected and aid from the man in the next seat is of doubtful quality. All students struggle for a position in the rear row of seats and those located

there try to retain their positions. The competition for the rear seats has improved scholarship and we consider it to be a distinct improvement over the old system.

The Cooper Union.—A great loss was suffered by The Cooper Union on March 28 by the death of Dean Francis M. Hartmann. Connected with all phases of development of the engineering courses for over thirty years, his was an unusual and outstanding figure in the life of the institution. Able administrator, clear and rational thinker, inspiring teacher, warm and loyal friend, he gave his all to his Alma Mater in untiring and unselfish service.

On March 30, the Trustees placed in charge of the Day and Night Schools of Engineering, with the title of Acting Dean, Professor Geo. F. Bateman, Head of the Mechanical Engineering Department. Connected with The Cooper Union for the past twenty-five years, Professor Bateman has been Chairman of the Student Relations Committee since 1922 and has always been actively connected with Alumni affairs.

The opening of the current term has been especially marked by the inauguration of the new Six Year Night Courses in Engineering. These supplant the old Five Year Courses which have been in operation with various modifications and alignments for over forty years, and places the Night Engineering School on the same registered collegiate basis as the Day School. To these new Night Courses some 1,116 appplicants took the competitive examinations for admission, from which group 226 were admitted—the limit of plant facilities. This high degree of selection is found also in the Day School where 111 candidates were admitted this Fall from 725 taking the entrance examinations.

Chief among the changes in physical equipment are those in the Electrical Machines Laboratories, where by the construction of a mezzanine gallery the available floor space has been increased by 50 per cent. The mezzanine provides for the suitable table grouping of students for computation and reference purposes as well as for the new Communications Laboratory. In addition, the Machines floor has been completely laid out anew and much equipment added. As a memorial to the late Dean Hartmann there has been installed on the mezzanine Professor Hartmann's private technical library which together with the Department's reference collection are housed in a case of classic design and inscribed as The Francis M. Hartmann Memorial Collection.

Among the additions of apparatus to other departments are:

Civil Engineering—A G-E Oscillograph for use in connection with the McCollum-Peters strain gage. Two "Last-word" strain gages, reading to 0.0001 inch. Home constructed compressometer for concrete cylinder testing.

Chemical Engineering—A Large Quartz Littrow Spectrograph with accessories. Hayes Electric Furnace with L. and N. indicating controller. Hydrogen Sulphide gasometer. Set of Atomic models.

The following promotions have been made: Norman L. Towle, to be Professor in charge, Department of Electrical Engineering; Harold W. Merritt, '21, to be Assistant Professor of Physics; James Coull, to be Assistant Professor of Chemical Engineering; Frederick H. Miller, '26, to be Assistant Professor of Mathematics.

Additions to the instructing staff have been made as follows: *Chemical Engineering*—F. R. Forrester, '30. *Civil Engineering*—J. P. O'Donnell, '30. *English*—R. W. Cumberland, M. Ling, F. C. Riedel. *Mechanical Drawing*—J. J. Currey, '12, K. Lofgren, '31, R. Salmonsen, '24. *Mechanical Engineering*—W. A. Vopat, '31.

Dartmouth College.—Professor H. J. Lockwood of the faculty of the Thayer School of Civil Engineering, has been granted a year's leave of absence at the request of Governor Winant, in order that he may continue work which he has been doing for the State during the past summer. Mr. Edgar J. Tuite, formerly an instructor at Rensselaer Polytechnic Institute has been granted a year's leave of absence by the New England Power Association, and will serve in Professor Lockwood's place.

Dean R. R. Marsden was elected Secretary of the New England Section of the S. P. E. E. at the recent fall meeting held at the University of Maine, Orono, Maine.

University of Delaware.—The effect of the depression on the Engineering School has been that lack of funds has allowed us to make no major additions to our laboratory equipment. Minor changes and routine additions to the laboratories have been carried forward as usual. Funds for the operation of the Engineering School have been reduced 10 per cent for this year.

The depression seems to have had little effect upon the number of students in attendance. This year the student body is the largest in the history of the School, having shown an average increase of approximately 5 per cent for the year, a condition which has existed for the last ten years.

Lack of spare cash seems to have instilled into the student body a spirit of seriousness and desire for study. 20 per cent of the class which was graduated last June has returned to the University for additional study. Some of these students are pursuing graduate work and some are studying for an additional undergraduate degree.

University of Detroit.—Three appointments were made in the College of Engineering for the coming year. Mr. Clement J.

Freund was appointed as dean to fill the place made vacant by the resignation of Mr. Russell E. Lawrence. Dr. Leonard M. Ekland was appointed professor of economics to fill the place formerly held by Dr. Edwin O. Graeffe, resigned, and Mr. Frank J. Oliver, Jr., was appointed industrial coördinator to fill the place made vacant by the resignation of Mr. Joseph F. Votrobeck.

Mr. Freund was graduated from the College of Engineering Marquette University. Since graduation he has had extensive experience in industrial engineering as well as in the educational field. He came to the University from the Falk Corporation, Milwaukee, Wisconsin, where he had charge of apprenticeship education and personnel.

Dr. Ekland is a graduate of the University of Iowa and has had considerable experience teaching before coming here.

Mr. Oliver is a graduate of Stevens Institute and comes from the McGraw-Hill Publishing Company. He was western editor of the American Machinist for the past three years. Previously he had been employed by the Gregg Engineering Company and the General Electric Company.

The attendance is not as great as in the past year. However, there has been little change in the number of upper classmen, the decrease being chiefly in the freshman class. A change was made in the freshman registration. It was recommended by the University authorities that freshman students register for full-time academic work instead of under the coöperative plan. This is a temporary arrangement but may be made permanent. The remaining four years are, however, on the coöperative plan. The freshman class comprises, normally, about one third the student body. The arrangement increases the available positions for the upper classes, jobs being the important consideration under the coöperative system.

Drexel Institute.—Dr. Parke R. Kolbe assumed the duties of president of Drexel Institute on October 1, 1932, a few days after the opening of the academic year. He succeeded Dr. K. G. Matheson, who had been president of Drexel for ten years prior to his death on November 29, 1931.

Dr. Kolbe was graduated from Buchtel College in 1901, took the degree of A.M. a year later at the same college, and then went abroad to study at Göttingen and Heidelberg. He received the degree of Ph.D. from Heidelberg in 1912.

In 1905 he became Professor of Modern Languages at Buchtel College, which later became the University of Akron. In 1913 he was made president of the University of Akron, where he remained until 1925. In that year he accepted the presidency of the Polytechnic Institute of Brooklyn, a post which he occupied until Oc-

tober 1 of this year, when he resigned to become president of Drexel Institute. The distinctive achievement of his administration at the Polytechnic Institute of Brooklyn was the development of an extensive program of evening graduate work.

Dr. Kolbe's experience has prepared him well for the presidency of Drexel Institute. Through many years of association with urban colleges he has become familiar with that type of institution; and as a member and past president of the Association of Urban Universities he has contributed to advancement of education in this field. Drexel operates, as is well known, on the coöperative plan in all but one of its four schools; exclusively in Engineering, partially in Business Administration and Home Economics. Dr. Kolbe believes in the coöperative plan, and as president of the University of Akron, has had experience in its administration. His wide range of contacts and experiences is important to an institution like Drexel, which includes a variegated group of schools, namely, Engineering, Business Administration, Home Economics, graduate Library School, and a large technological Evening School.

The George Washington University.—Professor Norman B. Ames, Executive Officer of the Department of Electrical Engineering, is spending his sabbatic leave at The Massachusetts Institute of Technology. During his absence Mr. Alfred G. Ennis is Acting Executive Officer.

Mr. Blake R. Van Leer, who formerly taught the course in Hydraulics as a part-time faculty member, is now Dean of Engineering at the University of Florida. Dr. Chilton A. Wright of the National Hydraulic Laboratory at the Bureau of Standards is now teaching this course.

Georgia School of Technology.—The enrollment this year is 2017, excluding the Summer School and the two evening schools. A four-year course in chemistry, in addition to chemical engineering, is now offered in the Department of Chemistry. C. A. Jones, who was an associate professor of textile engineering, has been appointed head of the Textile Department, succeeding Professor H. S. Busby, who resigned to accept another position in the textile field.

The Co-operative Department enrolled this year four hundred and thirty students in engineering and commerce. The employment situation is still very acute in the Southeast; about two-thirds of the co-operative students have employment. For more than a year now this department has operated under the quarter system, getting better results than it did under the monthly system.

The **Harvard Engineering School** is offering a new course in Soil Mechanics. The first part of the course will be devoted to a study of the physics of soils and the second part to the application of these principles to the science of foundations. A laboratory is

being equipped which will make possible for students to study the properties and characteristics of various soils. Opportunities are also offered to advanced students to engage in fundamental research in this field. Mr. Arthur Casagrande, a graduate of the Technische Hochschule in Vienna in 1924 and a former co-worker with Professor Karl Terzaghi of Vienna, has recently resigned from the United States Bureau of Public Roads, with which he spent the past six years as research assistant and research specialist in soils, to give this course and conduct the laboratory.

Mr. Robert P. Siskind has been promoted from Instructor to Assistant Professor of Electrical Engineering; and Messrs. Raymond T. Gibbs and George F. Ninde have become Faculty Instructors in the fields of Electrical Engineering and Engineering Drawing respectively.

Mr. J. P. Den Hartog, formerly Head of the Dynamics Section of the Westinghouse Electric and Manufacturing Company, has been appointed Assistant Professor of Applied Mechanics and will devote his attention more particularly to problems in vibration and in aerodynamics.

Mr. Arthur Casagrande, a graduate of the Technische Hochschule in Vienna, and for some years Consultant for the Bureau of Public Roads, has been appointed Lecturer in Soil Mechanics.

The fan-testing laboratory, which has been developed in recent years, has concerned itself more particularly with research problems in the fundamentals of air flow as influenced both by the fan itself and by the form and dimensions of connected ducts. Some very important and extremely interesting results have already been obtained which have brought about considerable economies in power plants of large public utilities.

There has been developed during the past year for research problems in graduate work, a rectifier laboratory, equipped for the study of combined systems of rectifiers, inverters, and rotating electrical machines. The laboratory involves many novel features which have proved of interest to other laboratories for graduate or advanced work.

There has also been developed during the past year a new laboratory for the study of applied mechanics, where problems in elasticity and dynamics may be investigated.

The total registration in the School is 218, there being 112 graduate students. Of the 112 a considerable number are candidates for the degree of Doctor of Science in Engineering. A growing appreciation of the advantage of a broader educational foundation before taking intensive professional work in the Graduate School of Engineering, coupled with the advice of members of the Faculty, has led eighty-four students, fifty-one of whom are first-year men,

to transfer from the Engineering School to the College. This is in accordance with the interest of the Faculty of the School to establish the work largely on a graduate basis.

The fixed curriculum has been done away with, the course of study of substantial character being determined largely by the student, subject to the approval of the Committee on Degrees.

University of Illinois.—Dr. Arthur Newell Talbot was awarded the Lamme Medal by the Society for the Promotion of Engineering Education at the fortieth annual meeting of the Society in Corvallis, Oregon, last summer for his "accomplishment in technical teaching" and "actual advancement of the art of technical training." Professor Talbot is the fifth recipient of the Lamme Medal. Other awards which have come to Professor Talbot are the Turner Medal of the American Concrete Institute, the Henderson Medal of the Franklin Institute, and the Washington Award of the Western Society of Engineers. He has received the honorary degree of Doctor of Science from the University of Pennsylvania, Doctor of Engineering from the University of Michigan, and Doctor of Laws from his Alma Mater, the University of Illinois.

Dr. H. F. Moore, Research Professor of Engineering Materials, delivered an address before the American Association of Universities at its meeting in Iowa City, November 11. Professor Moore's paper was entitled "The Present Trend of Engineering Research."

Professor H. M. Westergaard was on a short leave of absence from the University, October 17 to November 5, 1932, for the purpose of attending conferences with the Hoover Dam Consulting Board and the Colorado River Board, for the purpose of giving expert information on technical phases of the design of the Hoover Dam. Professor Westergaard spent the academic year 1929–30 with the Bureau of Reclamation in Denver making an analytical investigation of the many preliminary designs of the Hoover Dam.

Professor William F. Shulz of the Department of Physics, is absent from the faculty this year on a sabbatical leave of absence which he will spend in research in the field of applied optics. He will spend some time in the Imperial College of Science and Technology in London, and will then go on to the University of Jena in Germany. Just before Professor Schulz left for Europe a new text by him entitled "Experiments in General Physics" was issued by D. Van Nostrand Company.

Professor Otto Graf, Research Professor in the Technical College of Stuttgart, Germany, visited our Engineering Experiment Station Laboratories in September to look over the work which is being done in concrete.

Professor R. V. Southwell, Professor of Engineering Science at Oxford University, England, visited the College in October in the

interests of the Commonwealth Fund, of which he is a member of the Committee on Awards. Professor Southwell is especially interested in engineering materials and aerodynamics.

Mr. J. H. Chesters, a recipient of one of the Commonwealth Fund fellowships, is doing graduate work this year in our Department of Ceramic Engineering.

Enrollment in the College of Engineering dropped this year to 1,152, which is 205 less than last year. This count was taken October 1. There have been a number of registrations since that date so that the total enrollment for the semester will be somewhat greater than 1,152.

A four-day trip of inspection to industrial plants and to construction projects in either Chicago or St. Louis and vicinity has been made annually by the senior students in the College of Engineering for a number of years. This year the trip is to be omitted from the College program because of present economic conditions.

Iowa State College.—Professor T. R. Agg was appointed Dean of the Engineering Division upon the retirement of Dean Anson Marston. Dean Agg graduated from Iowa State College in 1905 and returned as a member of the Civil Engineering Department and Experiment Station staffs in 1913. He was appointed Professor of Highway Engineering in 1915 and assistant to Dean of Engineering in 1930. He is a member of the Executive Committee of the Highway Research Board.

Dean Marston graduated from Cornell University in 1889 and came to Iowa State in 1892. He was appointed Dean of Engineering in 1904. Under his guidance the division grew from a few hundred to over 1,700 students. In addition to his administrative and teaching work, he found time to do a large amount of outside engineering work.

From 1902 to 1912 he engaged in outside engineering work, involving design and construction of waterworks, sewerage systems, drainage systems, bridges, and the like, throughout the Middle West. Since 1912, his College, Experiment Station, Highway Commission, Society and Committee duties made it necessary to give up most of this type of work, except for an occasional large and especially important project, such as the valuation of the waterworks systems of Waterloo, Iowa, and of Rockford, Illinois; an investigation of the waterworks situation in Dubuque, Iowa; an investigation into the necessities of river front improvements at Cedar Rapids, Iowa; recommendations for flood protection measures, Indiana Creek, Council Bluffs, Iowa; an investigation of the failure of the 54-inch outfall sewer at Lincoln, Nebraska, and its causes; member Engineering Board of Review, Chicago Sanitary District; consultant on proposed Estuary Subway connecting Oakland and

Alameda, California; consultant on extensive sanitary engineering improvements, Miami, Florida; appointment by Government as member of five to investigate economic aspects of the Columbia Basin Reclamation Project, involving some 1,700,000 acres and an estimated cost of about $300,000,000, Florida Everglades Commission, and the Hoover Commission on the Panama and Nicaragua Canals.

During the years he has published some 200 professional papers and technical reports in various engineering journals and proceedings of engineering and educational societies, and research bulletins of the Iowa Engineering Experiment Station.

He now is carrying practically a full teaching schedule of graduates and undergraduates in Engineering Valuation. He is also completing a series of Experiment Station Bulletins on the same subject. He has recently been appointed Chairman of the A. S. C. E. Valuation Committee and a member of the Mississippi River Engineering Board of Review.

Professor H. J. Gilkey has been appointed a member of the Joint Committee on Specifications for Concrete and Reinforced Concrete as a representative from the American Society of Civil Engineers. He is also continuing as a member of the Concrete Research Board for the U. S. Bureau of Reclamation in connection with the Hoover Dam.

Professor Wm. L. Hunter will be Chairman of the Industrial Arts Section of the American Vocational Association at Kansas City. He is a member of the tests and measurements committee of the same section.

University of Iowa.—Two new buildings will be opened this year, the Mechanical Engineering Building and the enlarged Hydraulics Laboratory. The former houses all of the laboratories of that department and the latter provides for regular instruction together with the rather extensive program of investigations of the Iowa Institute of Hydraulic Research. A description of each building and of the services provided will probably appear later in the year.

The facilities for instruction and research available to the College of Engineering have been enhanced also in sanitary engineering by the completion of the purification plant for the University Water Works and in mechanical engineering by the completion of the new Power Plant with its diversified equipment. In both of these, the uses for instruction and investigation were kept in mind in the design.

The investigative work involved in the program of river improvement on the Upper Mississippi, the Ohio and its tributaries, and the Missouri is being carried on in the hydraulics laboratory.

A coöperative arrangement with the U. S. Geological survey has just been consummated looking to a study of Iowa streams. Mr. Rudolph G. Kasel has been appointed as District Engineer in Division of Water Resources with headquarters at the Hydraulics Laboratory.

The library of the College of Engineering has been extended to occupy twice the space formerly occupied. The rooms occupied are fire proof so that even the more rare volumes are adequately provided for. The advantages derived from having all engineering works close at hand are so compelling that the maintenance of the separate library will doubtless be continued as a policy.

During the past year, Professor F. A. Nagler has received the award of two medals from the American Society of Civil Engineers, namely, the Norman Medal and the Croes Medal, for excellence of papers presented. Inasmuch as Professor Nagler had twice received the Collingwood Prize in previous years, he has the distinction of being the first member to receive as many as four awards for excellence of papers presented.

The outstanding feature of the enrollment this fall is the increase in graduate students. Owing to the absence of technical employment, recent graduates have recognized that the present is an opportunity to continue in scientific preparation. The alternative for many would be to return home where they would rust out. The graduate enrollment includes a considerable number of foreign students, some of whom had their undergraduate training in European schools and some in American institutions. Economic conditions abroad probably account in part for this situation.

The senior class is of record size while there has been some decrease in the two lower classes.

Mr. T. R. Thoren has recently been appointed instructor in mechanical engineering. Mr. Thoren graduated, 1931, at the University of Michigan in both mechanical and aeronautical engineering. He is a member of Tau Beta Pi and other honorary societies. R. M. Barnes, Associate Professor of Industrial Engineering, is on leave for the first semester.

While the depression has not caused noticeable change in the content of courses, there is a striking change in the attitude of the students in that a new seriousness is manifest. A few years ago, students had the air of sophistication and self-sufficiency, whereas now they have more the manner of baffled persons eagerly, even wistfully, seeking the answer to the serious problems of the times. The average scholarship rose perceptibly last year, and indications point to a still further advance this year. Some extra-curricular lessons are being learned in these days which maye be as important as mechanics.

Kansas State College.—Associate Professor F. J. Cheek and Instructor J. T. Ware are on a year's leave of absence for advanced study at the Massachusetts Institute of Technology and at Harvard respectively. F. M. Adair and R. I. Lockard are serving as temporary instructors during their absence.

A television broadcasting station has been built the past year by the Department of Electrical Engineering. The construction work was done by Instructor L. C. Paslay and Messrs. H. H. Higginbottom and W. R. Mitchell, graduate assistants. The station went "on the air" October 12th and was checked for stability and frequency by the U. S. Monitoring Station at Grand Island, Nebraska. It will be known as W9XAK and will operate at a frequency of 2150 kilocycles.

The Metallography Laboratory was moved last summer to larger quarters and a dark room was added for making microphotographs of metal structure.

The Department of Applied Mechanics has added a new 300,000 pound Emery hydraulic testing machine for use both in laboratory instruction and in tests for the Kansas State Highway Department.

University of Kansas.—The illness of Dean George C. Shaad of the School of Engineering and Architecture of the University of Kansas has necessitated his absence for a few weeks. Professor Earl D. Hay has been made Acting Dean. From 1918–1930 Professor Hay was in the Department of Mechanical Engineering at the University of Illinois; from 1920–1924 Dean of the College of Engineering, Des Moines University; 1924–1928 Dean of the College of Engineering of the University of Wyoming; and since 1928 has held the position of Professor of Mechanical Engineering at the University of Kansas.

University of Louisville.—Dean Brigman has been elected to represent the American Society of Mechanical Engineers for a two year period beginning January 1, 1933, on the American Engineering Council. He has also been chosen as one of the thirty-seven advisory engineers in the country who are serving on the local advisory boards of the Reconstruction Finance Corporation to handle the applications for self-liquidating loans.

University of Maine.—B. F. Brann, Associate Professor of Chemistry, who spent the academic year of 1931–32 on a sabbatical leave doing specialized work in Physical Chemistry at Massachusetts Institute of Technology, resumed his work at the University of Maine this fall. It is regretted that Dr. William H. Gauger, who was temporarily added to the staff for the period of Professor Brann's absence, could not be permanently retained. There have been no staff resignations this year.

Joseph Conrad Twinem, Instructor in Civil Engineering and Maine State Geologist, is absent on a year's leave of absence to pursue graduate work at Massachusetts Institute of Technology. Mr. Twinem's civil engineering work is being cared for by the temporary appointment of Hugh D. Chase, S. B. in Civil Engineering, M. I. T. 1923, S. B. in Geology, M. I. T. 1931; S. M. in Geology, M. I. T. 1932.

Copies of the *State Geologist's Report on the Geology of Maine 1930–1932,* by Joseph Conrad Twinem, State Geologist, and Edward H. Perkins, Assistant Geologist, may be secured from the State Library at Augusta, Maine.

The fall meeting of the New England Section of the Society for the Promotion of Engineering Education was held at the University of Maine on October 8. Any report of the meeting would be incomplete if special mention were not made of the critical and decretory papers presented during the afternoon session: "Greater Emphasis Upon Scientific Thinking," by Robert E. Doherty, Professor of Electrical Engineering at Yale University; and "A Critical Examination of Our Present Scheme of Examinations," by Vannevar Bush, Vice-President and Dean of Engineering at Massachusetts Institute of Technology. These papers, which emphasize the need of developing creative thinkers as well as technicians in our engineering colleges and offer definite suggestions for achieving this objective, are well worth any progressive engineering educator's trouble in securing them. It is hoped they may be found in a later issue of the JOURNAL of the Society.

A new two-hour course in Elementary Radio Engineering has been added to the fall semester program of the Department of Electrical Engineering. This is preliminary to an advanced course, with laboratory, given in the spring semester.

The Department of Civil Engineering has remodeled a large space above the top floor of Wingate Hall, which will be used for research work. The first project carried on there will be the making of a relief map of the Katahdin Region of Maine.

New equipment in the College of Technology includes:

1. A complete new electric blue print machine, with an electric dryer, in the Department of Engineering Drafting.
2. A new precise level, similar to that used by the United States Geological Survey, in the Department of Civil Engineering.
3. A 40 H.P. uniflow steam engine; a 40 H.P. two stage air-compressor; and a 40 H.P. reaction water turbine to operate under a 20 foot head, in the Department of Mechanical Engineering.

Massachusetts Institute of Technology.—On the evening of September 7, Sir Arthur Eddington, the distinguished British

astronomer, delivered a lecture on "The Expanding Universe" in Walker Memorial. So great was the demand for admittance that 500 extra seats were provided in the gymnasium whence Sir Arthur's address was carried electrically. The audience is said to have been the largest on record in Boston for a lay scientific lecture.

On September 9th the military order of the Purple Heart was conferred on Lieut. Col. Frederick G. Keyes, head of Technology's Department of Chemistry.

The engineering profession mourns, in company with Technology, the passing on October 6th of John R. Freeman of the Class of 1876 who has been a member of the Institute Corporation since 1893. His achievements in the field of hydraulics made him internationally famous.

One of the most interesting developments which Technology has produced for some time is the apparatus which has been perfected by Professor Harold E. Edgerton and Mr. Kenneth J. Germelhausen of the Department of Electrical Engineering.

Photographs at the rate of 4000 a second, and with exposures ranging from 1/100,000 to 1/500,000 of a second have recently been made at the Institute, by means of a new electrical circuit which produces light many times more brilliant than sunlight and of a great actinic intensity.

The device has already been used to make striking photographs in which familiar things are shown in astonishing new forms. The splash of a drop of milk on a hard surface is revealed in the shape of a miniature crown tipped with infinitesimal pearl-like drops. The question, "How quick is quick as a wink?" was answered by photographs of the human eye which show that a wink occurs in approximately one fortieth of a second. The photographic image recorded at the instant of impact between a golf club and ball shows clearly the momentary flatening of the latter at the point of contact.

As a tool for research, this device opens new prospects for study. It is compact and portable, and is expected to be of great value in the photography of transient motion, types of motion which occur only once. To the scientist it offers unusual opportunities for the study of motion in liquids and gases.

In continuation of last year's program, Technology is again offering courses for the benefit of unemployed engineers and architects. The subjects offered during the first term include accounting, distribution of electricity for light and power, European civilization and art, soil mechanics, hydraulics, highway engineering, marketing, materials of engineering, refrigeration, reinforced concrete design, and the theory of structures.

University of Michigan.—Certain changes for requirements for graduation will go into effect this year. Two courses in Economics will be required instead of being optional as heretofore; the requirements in English and Engineering Mechanics have also been increased, and some time set aside for non-technical electives. A combined curriculum has also been arranged with the School of Education, whereby a student will be allowed to take certain electives in that school during his regular course, and on the completion of an extra Summer School will be granted the State Teacher's Certificate.

The number of students registered in the combined Engineering-Law Course, which was started a year ago, has practically doubled this year.

The Transporation Library was enriched this year by the addition of the Davis Library, which places this unit as perhaps the leading one in the country for this particular subject.

The enrollment of undergraduates is about ninety less this year but the number in the graduate school shows an increase.

Michigan College of Mining and Technology.—The appointment this fall of three assistant professors and four instructors brought the total number of faculty members at Michigan Tech up to 72. Four new laboratory assistants and ten new student assistants were also put on the rolls in September. Departments enlarged through the additions mentioned are mathematics and physics, chemistry, metallurgy, geology, and mechanical engineering.

Promotions announced are those of Dr. Glenn Damon from instructor to assistant professor of chemistry, of Henry R. Reed from assistant professor to associate professor of electrical engineering, and of C. T. Eddy from assistant professor to associate professor of metallurgy.

Among courses introduced this fall are operational circuit analysis, advanced commercial Spanish, advanced French, and special non-ferrous alloys. Alloy steels and special ferrous alloys. and systematic crystallography have been greatly expanded.

Researches which are receiving special stress this year are those connected with the college's program of geophysical studies, and also work on the utilization of low-grade iron ore, on new uses for copper, on corrosion, and on certain problems presented by radio communication in the upper peninsula of Michigan.

A three-story addition to Koenig Hall, chemistry building, was put in service this fall with the opening of laboratories for chemical engineering and qualitative analysis. The physical chemistry, organic chemistry, and gas and fuel analysis laboratories of the annex have been utilized since early April.

Equipment recently purchased includes a dilatometer of the Esser type, manufactured in Germany and used for research purposes in thermal analysis of alloys and alloy systems, particularly for dilation, for the study of thermo-energies, and for the determination of coefficients of electrical resistivity. This apparatus is said to be the only one of its type possessed by a U. S. educational institution. Somewhat overlapping the field of use of the dilatometer is an automatic thermo-analyser devised during the summer by Professor C. T. Eddy. The new instrument will be employed in research into the constitution of alloys.

Among major events of the late spring and the summer was the conferring of the honorary degree of Doctor of Engineering on Scott Turner, director of the U. S. Bureau of Mines and president of the A. I. M. M. E., and on C. Harry Benedict, chief chemist and metallurgist of the Calumet and Hecla Consolidated Copper company. Mr. Turner is an alumnus of Michigan Tech, and Mr. Benedict serves the college as special lecturer on metallurgy.

Three faculty members spent the summer in Europe. Professor James Fisher, head of the mathematics and physics department and director of geophysical research, was the college's official representative at the International Congress of Mathematicians at Zurich. Professor R. R. Seeber, head of the mechanical engineering department, inspected many technical institutions and industrial plants, especially in Germany. While on an inspection trip to Katowice, Poland, he was authorized to act for the president of the college in conferring on George S. Brooks the degree of engineer of mines. Like many other students during the hard times of 1904, Mr. Brooks lacked funds to meet the fee for a diploma and consequently did not receive one, though he had completed all studies leading to the E. M. degree. Paul Rohrke, instructor in scientific German, spent three months in Prussia, Bavaria, Baden, and the Rhine region, gathering material for his courses.

Also worthy of note among the summer's activities are the gold-prospecting trips taken by several groups of seniors and of recent graduates. Three parties, totaling 22 men, sought the metal in Georgia, Colorado, and the Huron mountains of Michigan. The Huron group took the prospecting work as a regular course under the supervision of members of the metallurgy staff.

The James Millikin University.—Three years ago a new curriculum was announced for Milliken University, that of Engineering Administration. This included a course in Resistance of Materials, which is being taught this fall and is in charge of Mr. Earl C. Kiefer, head of the mathematics department.

University of Minnesota.—Effective in the fall of 1932 the following changes in the admission requirements and procedure were

adopted last year. The third year of high school mathematics including higher algebra and solid geometry are required for admission without condition. Instruction in these subjects which has been given without credit under certain circumstances in the past has been discontinued.

Only those applicants who stood in the upper sixty per cent of their high school classes on the basis of high school grades are admitted directly to Engineering, Architecture, or Chemistry on the basis of their admission requirements. Those standing in the lowest forty per cent are given individual consideration in the light of all available information and admitted only as exceptions to the general rule.

New instructors are: Dr. Paul D. Bartlett and Dr. C. Frederick Koelsch in Organic Chemistry, Mr. Howard W. Barlow in Aeronautical Engineering, and Mr. Bruce L. Ray in Mechanical Engineering. Professor Rhodes Robertson of Architecture is on leave of absence this year in Europe.

The enrolment this fall in Engineering, Architecture, and Chemistry is about 1500 as compared with 1830 last year. However, the freshman class this year is only about half as large as that of last year in the fall term. Undoubtedly much of the decrease in the freshman class is due to the more severe entrance requirements and the new selective process. An unusual increase in graduate registration in engineering has occurred and the upper classes have sustained less loss than is usually the case.

Missouri School of Mines opens the year with a total enrollment of 501, which is comparable to a total enrollment of 649 for the same period last year. Last year's total enrollment of freshman students was 199 compared to 105 for the present year. As these figures indicate, the main decrease in student enrollment is in the freshman class. Students of the upper classes who regularly enrolled have been augmented in number by transfers to this from other schools. An unusually large return of sophomore students who were registered last year in sections arranged for gifted students is apparent.

The following changes in faculty have occured. Professor C. R. Forbes, head of the department of mine engineering, is absent on a year's leave and his place is taken by Professor J. H. Steinmesch. Mr. Steinmesch has for many years been associated with the Desloge Lead Company and later with the St. Joseph Lead Company when these two companies consolidated. This is his first year as an engineering teacher, but he brings to his work a wide experience in mine engineering.

Dr. M. E. Holmes, head of the department of ceramic engineering, is away on a year's leave of absence and is acting in the position

of dean at Alfred University. His place is filled for the year by Professor C. M. Dodd. Professor R. D. Duff has severed his connection with the department of chemistry and chemical engineering.

In spite of series decrease in income from state taxation from which the institution derives its support, the school has been able to maintain its teaching staff intact. The most rigid economy is having to be observed in the purchase of supplies of all kinds and the faculty will be obliged to take a two months' cut for the present academic year. The usual quality of instruction has been maintained.

This school is one of a number of engineering colleges which, on recommendation of the Board of Investigation and Coördination, set up a program for the benefit of gifted students. Since 1925, the Iowa Placement Tests, supplemented by tests constructed locally, have been used as the basis for selection of gifted students. The departments teaching in the freshman year, including chemistry, drawing, English and mathematics, give a battery of placement examinations during Freshman Week—the week before the upper classmen assemble for registration. On the basis of these tests each department sets up its own gifted student program.

Last year one of the departments attempted work in a more intensive way with such a section than heretofore and endeavored to interest the gifted group in a series of discussion meetings planned for the group. Two of these were held in the evening during the week and for the freshman students. They were conducted much as the student sections of the National societies are conducted for upper classes. One member of the group acted as presiding officer and six or eight of the group (who had been engaged in engineering work before coming to this school) presented brief discussions on engineering problems with which they had had some contact. During regular class hours two trips were taken to engineering projects of interest, one being to Bagnell Dam on the Osage River, another to the State Highway drafting offices at Jefferson City. Another feature introduced was a series of four or five half hour talks by interested members of the faculty. These discussions were given during the regular classes in engineering drawing. The speakers were not required to talk about engineering or drawing. On the contrary, each of the speakers spoke on the broad relationships that the engineer of the future must assume toward industrial problems, labor and politics. In spite of these interruptions, students in the particular group and subject mentioned were able to cover more than twice the regular text and lecture materials ordinarily presented covering technical work of drawing and descriptive geometry, and also did more than the usual number of drawn plates. The plates drawn were much better

than ordinary. One reason for the added excellence of plate drawing is that an attempt has been made to analyze drawing ability into basic components, and to adapt instruction in the gifted section to the principles so discovered. A wide use is made of both objective tests and of objectively graded drawing exercises. In general, morale of the gifted section is entirely above that noted in any other year. Details in regard to the gifted student program may be obtained from H. H. Armsby, registrar, or C. V. Mann, head of the department of engineering drawing.

The **Newark College of Engineering** seems to have followed the many other urban colleges in having an increased enrolment this year. Our enrolment to date has been 625 as against 553 students last year, which in turn was higher than the 1930 enrolment.

Four instructors have been added to the faculty this year: Mr. R. F. Carey, instructor in Chemistry; Mr. D. E. Bogart, instructor in Engineering Drawing; Mr. F. Fuller, instructor in Mathematics; Mr. R. E. Mayer, instructor in Electricity.

A number of small pieces of equipment have been added to the Mechanical Engineering Laboratory this year for instruction purposes, including hydraulic weighing apparatus, an airplane test stand and a new steam turbine. The latter was designed in one of the laboratory courses and built in the College, and was later tested to a speed of 50,000 r.p.m. The department expects to have by December 3, the date of the meeting of the Middle Atlantic Section of the Society, a new steam turbine generator set and a torsion dynamometer, in addition to the above.

New Mexico State College.—Dr. James T. Rood. formerly of the University of Wisconsin, who had served two years as Dean of the School of Engineering, resigned on August 1st and was succeeded by B. P. Fleming, formerly of the University of Iowa. Harvey O. Garst, who for eight years had served as Professor and Head of the Civil Engineering Department, resigned August 15th to enter business with headquarters at Albuquerque, and D. B. Jett, who has served in the Civil Engineering Department for seven years, was promoted to the Acting-Head of the Department. J. W. Jourdan, a graduate of Purdue, who for about nine years was Designing Engineer for the San Joaquin Power and Light Company, was appointed Assistant Professor of Civil Engineering. Mr. Jourdan had previously been connected with the institution as instructor in civil engineering.

The 10,000 watt radio station, known as KOB, developed almost as a personal enterprise by the late Dean R. W. Goddard, was leased, beginning the first of July, to the Albuquerque Journal Publishing Company, Albuquerque, New Mexico, and all station equipment was removed from the campus and erected at Albu-

querque. The station will be licensed under the same symbol designation as formerly and the announcement will still be made in the name of the State College of New Mexico as owner. Instruction in radio communication will be continued but purely as a course offered by the Electrical Engineering Department, of which M. A. Thomas has been appointed acting Head.

The freshman enrollment decreased about 15 per cent from that of the preceding year, many students failing to make the necessary financial arrangements which would enable them to attend college this year. Plans are underway for the establishment of a student branch of the American Society of Civil Engineers, and an attempt will be made to secure affiliation of the local honor engineering society with a national organization.

The Engineering instructional staff is coöperating with other groups on the campus in an intensive study of the tax situation which it is hoped may be of use to the Legislature in its coming session.

College of the City of New York.—The new building of the School of Technology of the College of the City of New York has been in use for one year and the equipping of the laboratories is about completed. The Materials Testing Laboratory has been designed and equipped with student instruction as its first consideration and research in materials as a secondary possibility only. The general policy of the College of the City of New York is to keep classes down to a maximum enrollment of twenty-five men. Whenever more than that number register for a course, other sections are formed. Following out this same policy, the Materials Laboratory was designed to accommodate eight squads of three men each. This meant that a number of smaller capacity machines must be provided instead of one or two large capacity machines.

The floor plan of the Laboratory is unique in that it occupies two floors, the basement and first floor at the north end of the new building. The design of the building is such that the Laboratory has outside windows on three sides. The floor space occupied consists of 2,500 square feet on each floor making 5,000 square feet in all.

The slope of the ground where the new building stands made it possible to design a short ramp entering the building at the north end that passes along the east side of the basement. A truck can be driven directly into the basement of both the Materials Laboratory and the Mechanical Engineering Laboratory to unload heavy equipment, test pieces, supplies, etc. A large freight elevator, 2,000 pounds capacity connects the two floors of the Materials Laboratory.

The mechanical equipment of the Materials Laboratory is very complete and covers all the standard machines now in use together with a few machines of special design. The heavy testing machines are located in the basement together with a few machines of special design. The heavy testing machines are located in the basement together with the concrete laboratory.

Inasmuch as hydraulics is required of all engineering students in the City College, for some time past the old laboratory has been inadequate to permit satisfactory accomodations of the rapidly increasing number of technical students. It is hoped that when the proposed installation is completed for the spring semester the problems of conducting experimental hydraulics will be solved.

The new Mechanical Engineering Laboratory, now being completed, is located in the basement of the Technology Building. It consists of four rooms all fifteen feet in height. The main room, containing the steam and gas power engines, is 82 feet long and 72 feet wide. Opening into the main room is a small instrument laboratory, an instrument store room, a supply store room and a machine shop. A ramp suitable for heavy trucks extends up to the street level.

The main laboratory is supplied with dry steam at 125 pounds pressure from the College boiler room. The steam mains with frequent tee connections extend across the room. The same system is used for the exhaust steam and exhaust gas lines, terminating in risers and running up through wells to the roof, three stories above. City gas and water, 230 and 115 volt D.C. and compressed air are available throughout.

The Mechanical Engineering Laboratory is unique in that it is a completely planned project built up from the blueprint stage. In contrast, most engineering school laboratories are an accumulation of equipment collected over a period of fifteen years or more and installed at different times as convenience and available funds permitted. The extensive planning of layout, selection of equipment, writing of special specifications and letting of contracts was completed in this case before a single piece of equipment was installed. It represents the tireless work of months on the part of Mr. Frederick Kuhlen, Professor of Mechanical Engineering, assisted in special cases by others of the staff. The newly completed installation, it is felt, now justifies this painstaking preparatory work. The laboratory offers a representative selection of modern mechanical engineering equipment, well coordinated and installed for the widest possible range of experimental work.

New York University.—It may be of some interest to compare the engineering registration of October this year with that of October last year:

New York University College of Engineering total registration: October, 1931, 901; October, 1932, 898.

A brick and steel addition has been erected adjacent to the Guggenheim School of Aeronautics building. This addition is free from inside columns and is used at the present for the housing of standard airplanes for instruction in maintenance and rigging. Eventually, it will be converted into a laboratory for the testing of hydroplane pontoons and floats.

Plans of considerable magnitude for work along Sanitary Engineering lines will be started with the opening of the present college year on September 19th.

Professor Thorndike Saville, professor of Hydraulic and Sanitary Engineering at the University of North Carolina, has accepted an offer from New York University to take charge of this important field as a new department in the College of Engineering. Professor Saville is widely experienced in the theoretical and practical requirements of his particular field.

Since 1920 he has been Chief Engineer of the North Carolina Geological Survey and its successor, the North Carolina Department of Conservation and Development, in charge of the Water Resources Division. He became a member of the University of North Carolina faculty in 1919, and soon developed graduate work in Hydraulic and Sanitary Engineering which has received national recognition. He holds degrees from Harvard, Dartmouth and Massachusetts Institute of Technology.

Arrangements have been made with the Graduate School of New York University whereby the degree of M. S. will be granted for graduate work in Sanitary Engineering. This work will consist of major courses offered in the new department of Sanitary Engineering together with courses already established in the Graduate School.

These courses will be inaugurated during the coming college year of 1932–33 and a few specially qualified men will be accepted. It is believed that the initial work can be adapted to the qualifications of the student to greater advantage than by setting up a definite curriculum, certainly during the first year. To give an idea of the character of studies involved, assignments may be made from the following groups:

Required Courses.—Advanced Hydraulic and Sanitary Engineering, Sanitary Engineering Laboratory, Sanitary Engineering Design, Hydrology, Regional and City Planning, Research in Hydraulic and Sanitary Engineering.

Elective Courses.—Water Power Engineering, Advanced Hydrology, Colloid Chemistry or other Chemical Option, Public Health Administration, Municipal Government, Business

Combinations, Statistical Technique, Seminar in Problems of Water Conservation.

It is planned for another year to have a "Sanitary Option" in the Senior Year for undergraduate students in Civil Engineering whereby certain more or less specialized courses in other fields will be replaced by courses in Hydraulic and Sanitary Engineering.

It is believed that the future demands for highly specialized training in hydraulic and sanitary engineering justify the establishment of specialized facilities for graduate study and research, particularly in the great metropolitan center of New York. No New York institutions are listed in the latest publication of the United States Public Health Service presenting an analysis of courses in sanitary engineering at educational institutions in this country.

The growth of urban civilization, particularly in New York City and State, produce increasingly complex problems of a sanitary engineering nature. The conflict between uses of surface waters for public water supply on the one hand, and as carriers for domestic sewage and trade wastes on the other; the prevention of pollution of coastal waters by reasonable and economical engineering works; the safeguarding of milk supplies; the protection of inland water for fishing and recreational purposes; the administration of municipal sanitary engineering works such as those related to water supply, sewage disposal, shellfish pollution, sanitation of public buildings, stream pollution, and garbage and refuse disposal; and in general the orderly planning, construction and administration of cities and metropolitan regions from the standpoints of public health and convenience, all require engineers specially trained in the more highly technical phases of sanitary and hydraulic engineering.

The new work in these fields which New York University will begin to develop this year is expected to provide opportunities not only for training engineers for such public agencies as Municipal Water and Sewerage Departments, State Boards of Health, Conservation Commissions, and similar bureaus, but to make available laboratory and research facilities where special problems in sanitary and municipal engineering confronting the State, municipalities, and industries may be coöperatively investigated in a scientific and unbiased manner.

The provision made for financing water works and sewerage improvements from funds made available through the Reconstruction Finance Corporation should stimulate sanitary engineering work and make this a particularly attractive field for engineering employment at least for the next few years.

The University of North Dakota.—In North Dakota the state laws prevent state institutions from anticipating even a single cent of prospective appropriations. Purchases are not made, nor appointments made nor contracts signed, until the funds are actually on hand ready for payment without the slightest delay.

Therefore the alleged "depression" of present times, delaying collections of taxes in some cases and bringing about other limitations, have necessitated various temporary economies in the administration of the University of North Dakota, including its College of Engineering.

Among these is a temporary reduction in all salaries, to conform with the present supposedly lower cost of living. The reduction now in effect is a uniform ten per cent, and events have not yet made it certain whether or not any further reductions before the end of this year will be needful.

Some eliminations of elective subjects the present year, slight increases in numbers enrolled in a single section, and other arrangements to obviate increases in the number of teaching staff and laboratory assistants have been put into effect, although no radical changes have been made. But these rearrangements, with a very slight decrease in the total enrollment (only about three per cent) have justified some few reductions in faculty numbers. The work of some could be cared for, under the present special conditions, by other instructors who continued with the university.

Except in a few minor details of no importance, the College of Engineering will be able to carry on its work through the current year on the same standards and with the same efficiency as usual.

Effective in June, 1932, E. F. Chandler, who has been a member of the faculty since 1899 and has been Dean of the College of Engineering since 1925, retired from especial administrative duties, and hereafter will have merely regular teaching work with the title Professor of Civil Engineering, and Dean-Emeritus. Professor Louis C. Harrington, of the department of Mining and Metallurgy, who has been at the University of North Dakota since 1912 and was last year the Director of the Experiment Station, becomes also Acting Dean of the College of Engineering the current year.

Despite the depression, our enrollment the current year is within a very few of previous maximum; and the students now in attendance are especially characterized, as a whole, by their earnest attention and willingness to work.

Northeastern University.—The following promotions on the Faculty of the Day Division were effective in September, 1932: Dr. Wilfred Stanley Lake, from Assistant to Associate Professor of Economics and Chairman of the Department of Economics: Everett Carter Marston, from Instructor to Assistant Professor of

English; and Charles Oscar Baird, from Instructor to Assistant Professor of Civil Engineering. Professors Lake and Marston have been members of the Northeastern Faculty for over five years, and Professor Baird has been in the Civil Engineering Department for ten years. Mr. G. Raymond Fennell has been transferred from the Department of School Administration to the Department of Admissions.

Frank Lee Flood, B.C.E., of the engineering staff of Metcalf and Eddy, has been appointed Special Lecturer in Sanitary Engineering for the current school year. Forest Anderson, B.E.E., and Philip Parker, B.I.E., members of last year's graduating class, have been appointed Graduate Assistants and will give part of their time to laboratory work and the remainder to advanced study.

Enrollment in the School of Engineering is approximately the same as it has been for the last several years. Although business conditions are still such that a considerable number of the cooperative students are not assigned to engineering practice, no important change will be made this year in the plan of operation. A special series of liberal courses has been instituted without additional tuition charge to enable students not assigned to engineering practice profitably to employ their alternate five-week periods. Courses to be offered during the current year on this basis are as follows: American Literature, Contemporary Social Problems, History of Science, Modern European History, the Development of Educational Thought in Modern Times, and Educational Psychology.

The Department of Coöperative Work retains its full strength of seven faculty members except that Mr. R. O. M. Oberg, formerly one of the coördinators for electrical engineering students, will give his full time to alumni counseling and placement. Mr. Oberg will also serve as secretary-treasurer of the alumni association.

This year there will be no graduating class in the School of Engineering inasmuch as the last group of students to register on the old four-year programs were graduated last June. The first class to complete the five-year coöperative program will receive their Bachelor of Science degrees in June, 1934. The five-year program includes a full-time freshman year followed by four years on the coöperative plan, students alternating on the five-week basis. During the second, third, and fourth years students may elect full-time options of liberal subjects if they so desire, but in the fifth year coöperative work is required.

Northwestern University—School of Engineering.—*Registration.*—In the total registration there is a 7 per cent drop from that of last year. A reduction of 20 per cent in the enrollment occurred in the Sophomore and Junior years, but this was nearly offset by a

33 per cent increase in the Senior Class. The Freshman Class is about the same.

Effect of Depression.—Departmental expenditures have been reduced to a minimum and all salaries have been reduced 10 per cent.

Savanna-Sabula Bridge.—Professor George A. Maney, Professor of Structural Engineering, reports the completion of the bridge on October 10th. He was the consulting engineer on this project.

Deering Library.—This General Northwestern University Library which is a memorial to Charles Deering will be dedicated December 29th. Mr. James Gamble Rogers of New York is the Architect and Dean Wm. Chas. Bauer served as the owner's Consulting Engineer.

Ohio Northern University.—This year marks the opening of the new engineering laboratories, made possible by the acquisition of buildings belonging formerly to a manufacturing concern. The space has been divided into three sections which are being remodeled and furnished by the Mechanical, Civil, and Electrical Departments.

The Mechanical Department under the direction of Dean J. A. Needy, Dean of the College of Engineering, has procured complete machine shop equipment and is now busily engaged putting the shop in running order. Tentative plans have been made to set up a small cupola and electric furnace for moulding and heat treating steel, and to secure wood-working machines to complement a pattern shop unit. A complete steam laboratory will be available as soon as a small vertical tube boiler can be moved from the university power plant. A complete electric welding unit is now in operation, being used for general maintenance work and research in arc welding under the direction of Dean J. A. Needy, who is a member of the Fundamental Research Committee of the American Welding Society. When the building program is completed, the Mechanical Engineering will have one of the most complete laboratories in the state.

The Civil Department under the direction of Professor A. R. Webb has also been actively engaged in equiping its section of the laboratory. Last spring the seniors of the department constructed a 70 barrel concrete reservoir and a 50 barrel concrete stilling basin in the end of which a V-notch weir was formed. Platform scales with a secondary tank have been installed along with the pumps and piping necessary to move the water from the reservoir to the stilling basin and from the secondary tank back to the reservoir, thereby making the process continuous. The hydraulics department has been further complemented by the donation of two centrifugal pumps. Future plans include the installation of a Venturi

meter and apparatus for testing water meters, pumps, etc. The testing of materials equipment has been moved from the campus and is ready for use in the new laboratory building.

The Electrical Department is planning to move its equipment to the new laboratory during the holiday recess. The plans and layout of that section has been completed by Professor I. S. Campbell, Head of the department, thereby simplifying the work to a great extent.

By the first of next year all departments will have their respective sections in complete running order, thus completing a large step forward in making possible practical application of classroom theory in all fields of engineering.

The **Ohio State University** at Columbus originally was operated on the three-term system of division of the college year. From 1910 to 1922 the two semester division of the year was in use. Since 1922 the four-quarter system has been in use; all quarters are about of equal length; and no academic work is done during the month of September. Changes in the personnel of the faculty have caused a somewhat divided opinion as to the relative merits of the two plans. In 1930 President Rightmire appointed a committee to study the subject and report its findings to the University Faculty. The Committee included Dr. W. W. Charters, Director of the Bureau of Educational Research, who offered to the Committee the services of the Bureau. This gave the Committee a corps of trained clerical help under the leadership of Dr. W. H. Cowley as an experienced investigator in such research problems. The final report to the faculty was made by the Committee in June, 1931, and its recommendation to continue on the quarter system was adopted almost unanimously.

The University has now published a 52-page pamphlet by Dr. W. H. Cowley which contains an introduction by Professor T. E. French, Chairman of the Committee, and Chapters on the History of the American College Calendar, the Problem and the Method of Investigation, The Quality of Instruction, the Effectiveness of Examinations; the Advantages for the Student Body, the Advantages for the Instructional Staff, Administrative Efficiency, and the Quality and Success of the Summer Session, together with much statistical information and the tabulation of the votes of the faculty for and against the two systems.

It is thought that an investigation made under the direction of the Bureau of Educational Research by a Committee representing ten divisions of education and the Graduate School is worthy of consideration and study by all college administrators who may be interested in the question of "The Relative Merits of the Quarter and Semester Systems."

Oklahoma A. & M. College.—The continued shortage in funds which seems to be affecting education in this country has fortunately not brought about any changes in the status of our Faculty, both as to personnel and salary scale since last year although it appears that a reduced budget may be necessary next year. We are expecting to keep this year under the status established last spring, namely, a reduction of 13 per cent below appropriation of previous year. Inasmuch as it is felt that this much reduction was in line with the decreased cost of living the morale of the Faculty has been but little reduced. Although the depression has affected the income of the Faculty and our maintenance funds, not so with the students, as the enrollment has increased 7 per cent for the College as a whole, for the first semester and 5 per cent for the Division of Engineering, the enrollment in the latter now being 730.

We are continuing, insofar as possible, the work of the Engineering Experiment Station and have some interesting projects under way, the most comprehensive of which is "A Survey of the Sources of Water Supply of Oklahoma."

Oregon State College.—The reorganization of higher education in the State of Oregon through which the University became essentially a school of humanities and social science, and the State College became a school of science and technology, united in a system of higher education, directed by a chancellor, was officially established on the first of July last summer. The principal changes involved in the reorganization were, transfer of the School of Commerce from the State College to the University, and the transfer of the School of Science from the University to the State College.

Certain internal adjustments were also made. One of these was the coördination of Chemical Engineering, which had been a separate department, with the School of Engineering. Another was the abolishment of the School of Mines and the continuing of senior work in the School of Engineering under a mining department. The School of Engineering, therefore, now includes Chemical, Civil, Electrical, and Mechanical engineering together with Industrial Arts Education and Industrial Shop Administration among its degree granting divisions, and the departments of Highway Engineering and Mechanics and Materials which render service to the various degree granting schools.

The Chemical Engineering department has vacated its quarters in Science Hall and now occupies the first and second floors of the former School of Mines. During the current year the mining work required for those students who have been permitted by order of the State Board of Higher Education to complete their training in mining engineering will be continued by the joint use of laboratories with the Chemical Engineering department.

Mr. G. W. Gleeson, formerly of the department of Mechanics and Materials, has been transferred to the department of Chemical Engineering, and promoted to the rank of assistant professor. Mr. Gleeson was originally trained in chemical engineering. Professors C. A. Mockmore and J. C. Othus returned from sabbatical leaves which were spent respectively at the Universities of Iowa and Illinois.

Along with the readjustment of schools and curricula has come the inevitable reduction of salaries. These have been applied on a scale similar to the income tax scale; five per cent reduction to the first one thousand, eight per cent to the second, eleven per cent to the third, fourteen per cent to the fourth, and fifteen per cent upon all above five thousand.

Students of the Electrical Engineering department have maintained a brilliant record of victories in the competition for national prizes for best student papers offered by the A. I. E. E. First prize was won last year by J. Raymond Batcheller for a paper upon "A Bridge Method of Testing Welds," and honorable mention was attained by Clarence B. Parsons and Milton H. Tipton for a paper entitled "Influence of Preservatives on the Dielectric Strength of Wood." During the six years which the A. I. E. E. has offered these prizes students of the Electrical Engineering Department have taken seven of thirteen national prizes and all of the prizes for District IX.

The present economic conditions have, undoubtedly, been responsible for the reduction in the size of the freshman class to almost exactly fifty per cent of the class for last year. Upper classmen have, however, returned in much greater proportion. Approximately eighty-five per cent of the normal enrollment above the freshman class is recorded. During the past three years the enrollment has, however, decreased from almost nine hundred to a little over five hundred. This decrease in enrollment has made many staff adjustments necessary. Six professors and instructors have been released because of these changing conditions.

The Pennsylvania State College.—Professor C. L. Harris, Head of the Department of Architecture, has leave of absence for this academic year in order to carry on research at the Bureau of Standards on wind stresses in steel structures. Dr. L. F. Pilcher is Acting Head.

Special equipment has been installed in the new hydraulic laboratory of the Department of Civil Engineering for the study of flow through flumes and channels, having glass sides and bottom.

Gifts of aeronautical equipments which will be used in instruction and in research have been made to the Mechanical Engineering Laboratory and the Engineering Experiment Station.

The senior electives in engineering curricula have been increased to include science, arts or advanced technical subjects according to the needs or preferences of the student and the advice of his adviser. The purpose is to provide for a broader but purposeful choice of subjects.

University of Pittsburgh.—The Schools of Engineering and Mines opened the school year with the largest senior class of record. The junior and sophomore enrollment is normal, but the entering freshman class is about 25 per cent below expectation. It appears that students who had finished part of their course made every effort to return to college. On the other hand a considerable number of prospective freshmen who had been admitted, did not appear for actual registration.

There has been an increase in the number of students registered in the Department of Chemical Engineering. To care for the added load, Mr. A. W. Johnson, a Fellow of the Mellon Institute of Industrial Research, has been appointed Instructor in Chemical Engineering. There have been no other changes in faculty.

The new Cathedral of Learning of the University is being slowly completed and at the present time the seventh to the twelfth floors are being used for classrooms and offices. Many of the Engineering classes have been moved to this new building.

This fall, for the first time, each of the nine departments in Engineering and Mines offered a full year's program of graduate study leading to the Master of Science degree. The Westinghouse Electric & Manufacturing Company is coöperating in this program by offering Graduate courses taught by their technical specialists. Of special interest is a new advanced course in the Department of Industrial Engineering called Distribution Engineering and taught by Mr. Bernard Lester, Assistant Sales Manager—Industrial Department, Westinghouse Electric & Mfg. Company. About fifty graduate students have registered for the course.

Princeton University.—Two of the faculty of the School of Engineering of Princeton University made trips during the past summer on the Robert Stewart Brooks Fellowship Fund presented to Princeton University some years ago. The Brooks Fellowship is for the purpose of bringing the younger professors of the School of Engineering into contact with actual professional work and with professional engineers throughout the country. Professor L. F. Rahm visited a number of plants in which plastic molding is carried out for the purpose of securing information in connection with a book which he is writing. The trip not only included such plants in the East, but he was able to visit industrial establishments in the Middle West and South. Mr. E. K. Timby made a trip to the Pacific slope visiting civil engineering projects including the

Hoover Dam and bridge projects in California, and also was able to study at certain institutions the photoelastic work which is being done at these places.

During the past year the School of Engineering has utilized the industrial chemistry laboratory which has recently been equipped with semi-commercial units, and the remodeled part of the old chemical laboratory devoted to materials testing.

Mr. Clayton W. Morehead has been added to the faculty as Assistant for the coming year.

Professor W. B. Harris spending the first term of this year in California on sabbatical leave.

Professor F. H. Constant expects to spend the second term in Europe on sabbatical leave.

The enrollment for the coming year is two greater than last year although the freshmen class is slightly smaller than last year; the number of men in the upper classes and among graduate students is sufficient to have made up this decrease.

During the past year the forty students receiving the undergraduate degree, twenty-six received honors. Fourteen men received professional degrees in engineering.

Purdue University.—The main wing of the Mechanical Engineering Building was completed last summer and is occupied this fall. New quarters have been provided for Chemical Engineering in Heavilon Hall, and for the department of Applied Mechanics in Purdue Hall. For the first time in many years, the different engineering departments of Purdue University are well housed, with some space to spare. Enrollment figures up to date indicate that this year's engineering enrollment is about 10 per cent less than that of a year ago. The junior class is extremely large, but the greatest drop has occurred in the freshman class.

Due to drastic reductions in the income of Purdue University, salary adjustments had to be made for the entire staff, also considerable curtailment is expected in capital expenditures.

Dean A. A. Potter was elected president of the A. S. M. E. for the year beginning December 9, 1932.

Rensselaer Polytechnic Institute.—This year sixteen new dormitory units, in use for the first time, have added considerably to the campus life of the students at the Institute. Ten of these units are for upperclassmen who have heretofore had to live off the campus. Each unit is named after a railroad president who has been an alumnus. The other six new units are additions to the freshmen dormitories, making a total of nineteen buildings for the housing of freshmen.

There are five resident instructors living in the freshmen dormitories who have regular office hours on certain days of the week at

which times freshmen may consult them when needing help in their studies. This supplements the work of the regular mathematical consultant who has office hours twice a day during which he may be consulted free of charge by students of any class desiring help in mathematical subjects. It also supplements the work of four freshmen advisers who give advice to such students on all matters of general interest to them.

The work of the engineering and science clubs at Rensselaer is well under way. The Science Colloquium, which is composed of instructors and graduate students, was addressed last week by Professor H. W. Rand of Harvard on "Problem of Organic Form." The student branch of the American Society of Civil Engineers will hear a paper this week on "Structures" by David C. Coyle, Consulting Engineer of New York City. The other student branches of the national societies will begin their meetings early in November. The Biological Society has arranged a program of six lectures by distinguished speakers on public health and cognate subjects.

The Graduate School at Rensselaer continues to grow. This year there are seventy-eight students studying for advanced degrees.

A handsome new Club House, opened this year, is a valuable addition to the student life at Rensselaer. It has been presented to the students by the school for their use and no fees or annual dues are charged. There are reading, card and billiard rooms and a beautiful large lounge. Committee rooms are provided for all student organizations, including the student publications, musical clubs and a book store. On the top floor is a large ball room which will also be used for the bigger student meetings.

An interesting experiment in the determination of the effect of a certain percentage of clay on the permeability of concrete, which has been carried on for three years at Rensselaer in their materials testing laboratory, is producing results. Some of these have been published in a recent number of the Engineering and Science Series publications, issued from time to time by the Institute. The booklet is No. 36 of the Series, "Weathering Resistance of Concrete" by E. J. Kilcawley, Assistant Professor in the department of civil engineering. This piece of research will probably continue for two years more.

Rhode Island State College.—The total enrollment has increased about 50 per cent in the last three years.

The requirements for graduation have been very considerably increased during the last year.

In the engineering courses this requirement has risen from 136 to approximately 150 credit hours. Moreover, three actual hours of work are required for each laboratory credit hour.

Five additional members have been added to the Engineering Staff for this year's work. The following appointments have been made:

Civil Engineering and Mathematics, Mr. Donald E. Stearns; Physics, Mr. Nicholas Alexander; Electrical Engineering, Mr. William Mowbray; Shop Work, Mr. W. D. Archibald; Engineering Construction, Mr. George B. Nichols.

Rose Polytechnic Institute.—Students in the Chemical Engineering course will use this year for the first time the new chemical engineering laboratory which was completed last spring. The laboratory is equipped with standard apparatus for experiments in unit chemical engineering processes such as distillation, filtration, evaporation, etc.

Several thousand dollars worth of equipment have been added to the electrical engineering laboratory for experimental work in electronics. The new curriculum which goes into effect at the middle of the current year includes several courses in the more recent developments in electronics, electrodynamics and vacuum tube engineering.

Professor John B. Peddle has been granted a half-year's absence on account of ill health. Lt. Ole G. Hoaas, Engineer Corps, U. S. A., has been succeeded as Professor of Military Science and Tactics by Captain Joseph H. Stevenson.

South Dakota State College.—The death of Professor H. C. Solberg, head of the Mechanical Engineering department, ended a service of nearly 40 years in this institution.

Professor J. T. Strate has been secured as head of the Department. He comes from the University of Arkansas.

Swarthmore College.—Classes, starting on Friday, October 7th, found no change in the faculty of the Division of Engineering. There will be practically no change in the laboratory facilities during the coming year, except the addition of a new variable speed motor generator set, 25 cycles to 60 cycles, 25 Kv-a. to operate also as a synchronous motor, driving a D. C. generator. This machine will have a wide range of laboratory uses, and also may be used during the summer months as a source of direct current for the college.

A change in curriculum goes into effect with the incoming freshmen who major in General Engineering. They will be required to elect one of the following groups of subjects and to take not less than 30 hours in that group: (*a*) economics group; (*b*) political science group; (*c*) literature group; (*d*) manufacturing group; (*e*) scientific group. This means that the student, in addition to having his basic mathematics, science and engineering

courses, must go rather deeply into one of the above groups of correlated studies.

The enrollment at Swarthmore College is very little less than that of last year, and the enrollment in the engineering courses is also somewhat less.

Syracuse University.—The 90th meeting of the American Association for the Advancement of Science was held at Syracuse University in June, 1932. A symposium on Aerial Photographic Mapping and Surveying was held on June 21 at a joint session of the Engineering and Geology and Geography sections. The program was arranged by Earl F. Church, Associate Professor of Photogrammetry at Syracuse.

Agricultural & Mechanical College of Texas.—The College is engaged in a rather extensive building program. Under provisions made by the last regular Legislature a fund of Two Million Dollars has been made available for buildings and permanent improvements at the College. The building for the Department of Chemistry and Chemical Engineering is almost complete. One wing of this building houses the complete cottonseed oil mill, which is used for instruction and research work.

Other buildings under construction include the Agricultural Engineering building; a building to house jointly Petroleum Engineering, Geology, and the Engineering Experiment Station; a new Administration building, and buildings for Animal Industry and Veterinary Medicine.

The College water and sewer systems are being completely remodeled and new streets and roads and other campus improvements are to follow.

Dr. T. D. Brooks became Dean of the Graduate School at the beginning of this session.

University of Virginia.—The only change in our regular teaching staff was occasioned by the resignation of Charles Mortimer Daniel, former Assistant Professor of Mechanical Engineering. Pre-registration indications of a possible ten per cent increase in study body were unfortunately not borne out by the final figures. Financial difficulties were the undoubted causes of the failure of a considerable group of new men finding themselves unable to enter this year. Some slight effect also for the same reason prevented a few old students from returning. A flat salary reduction of ten per cent is in force for this school year with every hope and expectation, however, that a return to the full schedule will be possible for the next session. Several valuable items of new equipment in the Electrical and Experimental Engineering laboratories have been made available for service. It is expected that one or two new appointments will be made for the session 1933–34.

Texas Technological College.—The College opened the year 1932–33 under the leadership of a new President, Dr. Bradford K. Knapp. He was elected to succeed Dr. Paul W. Horn, the first President of the College, who died in April, 1932. Dr. Knapp comes from Alabama Polytechnic Institute where he was president during the past four years. Previous to this he was president of Oklahoma A. & M. College.

On January 1, 1932, Dean Wm. J. Miller resigned, to go to the University of North Carolina as Professor of Electrical Engineering, and Professor O. V. Adams was appointed Acting Dean.

New men on the faculty include Professor C. V. Bullen, Head of Electrical Engineering, who comes from the University of Oklahoma, and Mr. G. W. Parkhill, instructor in Civil Engineering.

The enrollment of the college has held up and will show an increase of about seven per cent for the whole college.

Mr. W. E. Street, a graduate of the college and a member of the Engineering Faculty, has been elected president of the Alumni Association. He is securing their active interest and enthusiastic support of the institution.

Vanderbilt University.—Dean William Henry Schuerman, C.E. (Cincinnati, died on August 11, 1932. Prof. Fred J. Lewis, C.E. (Maine), is serving as acting dean pending the meeting of the Board of Trust to appoint a permanent dean.

Joe Robert Hendrickson, M.S. (Vanderbilt), was added to the staff as Instructor in Civil Engineering.

The depression failed to hurt the enrollment this year. The shortage in the school being due to the small Freshman class of last year which carried over to this year would account for the present shortage.

Virginia Polytechnic Institute.—Dean E. B. Norris and Professor F. J. Sette have been appointed by Governor Pollard to his engineers' advisory board to investigate applications for loans under the Reconstruction Finance Act.

At its commencement in June, the University of South Carolina conferred the honorary degree of Doctor of Science upon Samuel R. Pritchard, Professor of Electrical Engineering and former Dean of Engineering at V. P. I.

Dr. Louis O'Shaughnessy has been appointed chairman of the Department of Applied Mechanics.

New Appointments.—D. H. Pletta, B.S. (Univ of Ill.), M.S. (Univ. of Wisconsin); Assistant Professor of Applied Mechanics; J. I. Clower, B.S. and M.E. (West Virginia Univ.); Assistant Professor of Machine Design; P. P. Stewart, B.S. (Univ. of Pa.); Instructor in Architectural Engineering; E. L. White, B.S and M.S. (V.P.I.); Instructor in Graphics, Norfolk Extension Branch; L.

W. Webb, Jr., B.S. and M.S. (V.P.I.); Instructor in Engineering Physics, Norfolk Extension Branch; C E. Trent, B.S. and M.S. (V.P.I.); Instructor in Engineering, Bluefield Extension Branch; A. M. Harris, B.S. (V. P. I.); Instructor in Graphics, Richmond Extension Branch.

Hamilton Parks, B.S. (V. P. I.), has resigned as Instructor in Architectural Engineering and is pursuing graduate study at the University of Illinois.

On October 1st the engineering registration was 977 as compared to 972 at the same time in 1931. There is a decrease in freshman registration, but an increase in numbers of seniors and graduate students.

A new Mechanical Laboratory was completed in the fall of 1931. Additional equipment has been purchased during the past year and is now mostly installed. Among principal items are 150 h.p. Sprague dynamometer, Worthington surface, condenser, 11″ Leffel hydraulic turbine, 6″ Ingersoll-Rand centrifugal pump, Packard inverted V-12 aeronautic motor, Hill diesel engine, variable stroke gasoline engine, and miscellaneous fuel and oil testing equipment.

The Materials Laboratory equipment has been augmented by the addition of a 400,000 pound Riehle compression machine taking up to 8½ foot specimens, a 30 Kg. m. Charpy impact machine and a fatigue machine.

A closed-circuit wind tunnel of three feet diameter at the test section is nearing completion in the aerodynamic laboratory.

Washington University (St. Louis).—The enrollment in the Schools of Engineering and Architecture for the current year shows a decrease of 4.8 per cent below last year's registrations; more specifically, from 522 a year ago to 497. These figures do not include the registration of graduate students in Engineering, since these are registered in the Graduate School. There has been a very considerable increase in the number of graduate students this year, as at most other institutions. An analysis of the cause of the shrinkage in undergraduate enrollment shows that most of it is due to a rigid enforcement of the General Deficiency Rule, which accounts for a drop of 35.

Dean A. S. Langsdorf has been appointed executive head of the Department of Applied Mathematics and Mechanics to fill the vacancy created a year ago by the death of Dean G. O. James, formerly head of the department.

The University adopted a plan of admitting as auditors unemployed persons who had had at least two years of college work. The purpose of this plan was to occupy the time of such qualified individuals in an effort to help maintain their morale. Applications

for admission on this basis were received from a very large number of persons, of whom approximately 100 were admitted to various divisions of the University. Of those admitted to the School of Engineering (not included in the above tabulation of registration), approximately 12 were graduates of other institutions; some of them are taking graduate courses, and others undergraduate courses which were not included in their previous course of study.

University of Washington.—During the past summer the Board of Regents and the President of the University effected a reorganization of the University of Washington, regrouping the thirteen schools and colleges originally existing into four. These four are: College of Arts and Sciences, College of Technology, School of Law, and Graduate School. They are under the respective deans of the former College of Liberal Arts, College of Engineering, Law School and Graduate School.

The College of Technology includes the former Colleges of Engineering, Mines, Forestry and Pharmacy, together with the Departments of Military Science and Tactics and Naval Science and Tactics. The latter two were included in the College on account of the rather close association which originally existed between the College of Technology and some branches of the Military and Naval Departments. The College of Forestry has many points of contact with Engineering and might legitimately be coördinated with it. Forestry is an important industry in the State of Washington and it would be unfortunate if its coördination with Engineering in the newly formed College of Technology should in any way restrict its usefulness or prestige. Pharmacy, however, has quite different aims, historical background and curriculum from those of the other groups in Technology and normally would not be included. In the present instance it was considered to be an application of Chemistry and Botany which should be grouped with the professions based on applied sciences. There is no medical college in the University with which it might be associated, and I feel that the present arrangement is more or less tentative.

The enrollment of the Engineering school itself is 6.1 per cent smaller than that of last year. The effect of the depression has been to decrease the freshman class, while increasing the upper-class and graduate enrollment. The total enrollment in Engineering at the beginnning of the fall quarter was 838, as against 893 last fall, while the total enrollment in the College of Technology is 1,143.

Plans for the reorganization above referred to had been under way for about two years. It was felt that too many colleges had sprung up and that a consolidation would make the administration of the University simpler and more effective and would provide the means of securing better coördination between the various groups.

Certain minor changes are being considered in the curricula of these colleges looking toward a closer consolidation and the minimizing of vocational leanings in the courses given, together with a strengthening of the fundamentals. As these changes will not take effect until next year, they need not be discussed at this time.

University of Wisconsin.—Non-resident enrollment, because of the high registration fees charged out-of-state students, took a drop of 27.4 per cent under the total non-residents enrolled a year ago, which amounts to a decrease of 626 students in this group.

Comparing the enrollment figure of a year ago, October 1, 1932, with that of the same day this year, Mr. Holt reported to the faculty that there are 948 fewer students enrolled in the University this year, a decrease of only 10.7 per cent.

The proportion of students from homes in Wisconsin at the state university increased this year to a new record high, according to the figures. A total of 78.9 per cent of the total number of students enrolled this year are from Wisconsin, while only 21.1 per cent are from outside the state. Last year, slightly more than 74 per cent of the total number of students came from homes in the state, while about 25 per cent came from out of the state.

Despite the highest standards ever enforced in the Wisconsin graduate school, the decrease in this division of the University was only slightly more than 4 per cent, Mr. Holt said. The total enrollment in the school last year was 1,173, while this year the total has reached 1,122.

The Law school was the only division of the University to show an increase in enrollment this year, the figures revealed. In this school the enrollment jumped from 275 to 302, an increase of 27 students or almost 10 per cent. Other divisions showed decreases as follows: College of Letters and Science, 11 per cent; College of Engineering, 13 per cent; College of Agriculture, 11 per cent; Home Economics, 10 per cent; School of Education, 12 per cent; and Medical school, 4 per cent.

Worcester Polytechnic Institute.—Initial undergraduate enrollment at Worcester this fall was 624. The shrinkage in the three upper classes was only sixteen. This year the Institute put into effect its new plan of selective admission, under which only about 150 men are to be admitted to the entering class. From a large number of applicants, 155 were chosen, as compared with 196 last year. There has been no reduction in teaching staff nor in salary scales, the Institute having passed through the past two years with a moderate surplus. Scholarship aid is being given to nearly one-third of the students, and additional loan funds are available.

Dr. Richard A. Beth, W. P. I., '27, who completed work in mathematical physics for the Ph.D. degree at Frankfurt last year,

has been appointed assistant professor of physics. Mr. Allen E. Anderson, Nebraska, '23, formerly at Harvard, is a new instructor in mathematics; Mr. Nelson M. Bortz, graduate of Ursinus, in economics; and Mr. Leslie M. Bragg, M. I. T., '25, lecturer in chemical engineering. Prof. Arthur W. French, head of the department of Civil Engineering, is on sabbatical leave, his place being taken by Prof. Jerome W. Howe, who has just returned from a year's study of German and English university and technical education. Prof. Gleason H. MacCullough has returned after a year's leave, during which he completed work for his doctor's degree in advanced mechanics at the University of Michigan. Dr. Walter L. Jennings, head of the department of Chemistry, has returned after a half-year leave spent in Italy and Germany.

The University of Wyoming.—Last summer we were able to secure a special appropriation for the purchase of a variety of laboratory and shop equipment from the Standard Oil Refinery in Laramie which has closed down. We secured about $2,100 worth of apparatus for a little less than $300.

The second item is the consideration of the addition of a course in general Engineering which will combine fundamental courses in Engineering with courses in Business Administration and Law with the idea of training students who feel better fitted for executive work in industrial positions than they do for technical work. The matter is still in its elementary stages and there is no possibility of saying at this time just what final action will be taken.

PROBLEMS OF ADMINISTERING ENGLISH WORK IN ENGINEERING COLLEGES *

By RAY PALMER BAKER

Professor of English, Assistant Director, Rensselaer Polytechnic Institute

The subject—problems of administering English work in engineering colleges—which has been assigned for the day's discussion is so inclusive that I have found it difficult to determine the limits which we should set for ourselves this afternoon. Those responsible for the programme of these sessions have been at such pains to provide for special consideration of every matter in which teachers of English in technical schools and colleges of engineering are, or ought to be, interested that I am inclined to wonder whether I have any function here at all. Although I have come to the conclusion that my task to-day is to indicate merely the character of the problems with which, as teachers of English, we are confronted, this justification for my presence—the best that I can offer—has not pointed to any obvious method of procedure. Consequently, after deciding that I ought to say something about the nature of the difficulties which belong particularly to our profession, I was far from certain as to where I should turn for information regarding them. Since the subject does not lend itself to statistical treatment, I have therefore determined that my function is something like that of the general practitioner whose duty is now confined to a tentative diagnosis before he calls in the specialists who have made themselves masters of particular fields. Such, at any rate, is the point of view which I shall try to maintain.

The analogy which I have suggested is more valid than it may seem. Those of you who are old enough to remember the "family physician" will not expect a very scientific analysis of the situation. A moment ago I remarked that the subject does not lend itself to statistical treatment, a technique which, Professor Taylor will assure you, is very modern indeed. The general practitioner knew nothing about any comparable methods. Consequently, since I have linked myself with him, I must warn you again that you will get nothing of the sort from me. Moreover, I warn you that I shall be frankly personal in my approach. No "family physician" ever consulted the literature connected with one of his cases; and I want

* The second of a series of two lectures delivered before the English Session of the Summer School for Engineering Teachers, Ohio State University, July 12, 1932.

to confess at this juncture that my impressions, like his, are based entirely upon experience, upon what I have observed and upon what, over the dinner table, I have learned from my colleagues.

From conversations under such circumstances I have gathered that the problems which will be considered in more detail by others fall into a number of obvious groups according as they are due to the organization of the Department of English, to the character of its instructors, to the attitude of the members of the faculty in general, and to the point of view of the students themselves. The incidence of these factors, however, differs according to the type of institution. It follows, therefore, that if we are to study their results with any sense of perspective we must consider their manifestations both in the technical schools and in the colleges of engineering attached to the universities. This is the procedure which I propose to adopt.

Before I turn to these topics as they bear upon the two groups of institutions represented here, it may be well to recall that in a number of respects they are sharply differentiated from one another. In the technical schools, all work is conducted under one authority. In the colleges of engineering, as I shall call their counterparts attached to the universities, authority is divided to such an extent that students often find themselves subject to the jurisdiction of several administrative units. As a result the technical schools possess a unity that is seldom duplicated in the colleges of engineering. On the other hand many of the latter are able to provide for their students a range of election possible only in the largest institutions of the other type. It is evident, therefore, that there are both advantages and disadvantages which we must weigh in due course.

It is significant that, with the exception of the California Institute of Technology, Armour Institute of Technology, and the Case School of Applied Science, the larger institutions belonging to the first group are to be found in the East. Consequently they have been influenced by their environment much as the academic colleges on the Atlantic seaboard have been affected. Although several of them—the Massachusetts Institute of Technology and Rensselaer Polytechnic Institute, more particularly—are national in appeal, drawing their students from all the states in the Union, all of them, like Yale and Harvard, are to some extent local institutions, reflecting the ideals and the interests of New England, New York, New Jersey, Pennsylvania, and the Old South. Their students differ materially, therefore, in background and outlook from those in the engineering colleges of the Middle West. If I were asked offhand to distinguish between the two undergraduate bodies, I would be inclined to say that at present the students in the tech-

nical schools of the East are largely urban in their origins, and that they represent either the wealth and culture of the American tradition or the vigor and crudeness of the latest immigration. They are, like their friends at Amherst or Williams, sophisticated young men, accustomed to the niceties of life, and amply prepared in the best schools for the tasks ahead of them, or they are ambitious lads from homes in which English may still be spoken with an accent. I think that it may be said of all of them, however, that the standard of intelligence among them is high. Of students in the colleges of engineering I am naturally less able to form an opinion. From what I have seen, however, and what I have heard, I am led to believe that they are more generally rural in their origins and that on the whole they represent a more uniform standard of wealth and culture.

In another respect, also, significant in connection with this topic, the technical schools differ from the colleges of engineering. Except in the older institutions of the East, like Pennsylvania and Cornell, which are privately endowed, or are only nominally subject to the state, the fees in the former are relatively high. In the latter they are relatively low. The result is a differentiation, based to some extent on wealth, that tends to draw to the technical schools students from homes of opportunity. Fortunately they have been alert to the dangers as well as to the benefits of this situation and through scholarship and loan funds they are making it possible for applicants of ability who are handicapped financially to enjoy the opportunities which they offer. As the representatives of the Massachusetts Institute of Technology and Stevens Institute of Technology will tell you, the happiest feature of this development is the increasing recognition given to scholarship. The higher fees in the technical schools have unquestionably worked to their advantage.

Between them and the colleges of engineering there are still other differences that are important for our purposes. Like the colleges of engineering in the older universities of the East, the technical schools are all privately endowed and controlled by boards of trustees that are largely self-perpetuating. As a result they are directed mainly by men of affairs, able and imaginative, through whom, incidentally, they have become increasingly integrated with the major industries of the country. Because of their organization they are a law to themselves, and they are quick to undertake experiments that are likely to add to their usefulness. Especially have they used their freedom to select with care those whom they accept as students. I do not know about the situation at this moment in the colleges of engineering, but I do know that in the technical schools applicants for admission must to-day meet much

more than the minimum requirements. The tendency among them is toward increasing unification of their activities, with emphasis upon standards rather than upon numbers. As I shall point out later, this development has a distinct bearing upon the subject before us.

If the organization of the technical schools is undoubtedly aristocratic, that of the colleges of engineering in the state universities is essentially democratic, resting firmly upon the popular will. As the technical schools are responsive to the demands of industry and finance, the latter are responsive to public opinion. Primarily they are servants of the commonwealths in which they are situated, and they inevitably bear the impress of their ideals. Unlike the technical schools, which, through the special courses maintained for graduates of West Point and Annapolis, are linked in some instances with the federal government, they have assumed many duties untouched by the private institutions. The contacts established in this way by the colleges of engineering such as those in the University of Illinois and the University of Wisconsin must be extremely valuable. Whether they work toward an increasing standard of scholarship, affecting the level of preparation in English as in other subjects, is a matter which I shall leave to others. From the opinions which I heard expressed a few weeks ago at a conference called by the Commissioner of Education in New York to consider regulations to govern the approval of curricula and degrees in technical schools and colleges of engineering, I gather that there is still some difference of opinion regarding their effects. However this may be, I believe that you will agree with me that we must approach the problems before us from the two points of view which I have suggested,—that of the technical schools and that of the colleges of engineering. The fact that there are institutions such as Lehigh University and Purdue University, which do not fall exactly into either category, but which exhibit certain characteristics of each, does not invalidate the procedure.

As you are all aware, the departments of English in the technical schools have always been as much a part of those institutions as the departments of mathematics or physics. During the last two decades, however, as a result of the increasing emphasis upon "general studies," as they are often called, and the obvious need for a more effective correlation of the material formerly presented in different courses, English and History were sometimes combined. More recently there has been a tendency to group together all those subjects that may be regarded as cultural rather than professional. Thus, at the Carnegie Institute of Technology there is now a "Division of General Studies," with a director, as chairman, and heads of departments. At the Massachusetts Institute of Technology,

which has always had a "Department of General Studies," a "Division of Humanities," to which I assume the Department of English belongs, has just been organized. At the Stevens Institute of Technology there has been for some time a "Department of Humanities," with the professor of English as chairman, providing for English, History, Psychology, and the Fine Arts. At Rensselaer I am responsible not only for the work in English and Public Speaking but also ultimately for that in such fields as History, Government, Economics, Sociology, and Psychology, all organized in a single department. Such an arrangement has obvious advantages.

It makes it possible to correlate, to unify, and to adapt the various courses in the humanities to the needs of the institution. In addition it gives them a prestige that is extremely valuable. When they are properly housed, they at once assume a position in the eyes of undergraduates that assures respect. It is impossible to make a better investment than the kind that many technical schools have made within the last few years. At the California Institute of Technology, for instance, the Division of Humanities, including English and Foreign Literatures, European and American History, Philosophy and Social Ethics, and Economics and Government, is, I understand, now located in its new "Hall of Humanities," and, as I have intimated, most of the other institutions which I have mentioned have made similar provision. In the light of my experience I regard this as a most important advance.

Because of the unified administration of the technical schools, and the fact that the head of the department of English ranks with and is associated constantly with the other heads in all faculty matters, there is usually agreement regarding its functions. To-day there are few teachers of engineering who are not keenly interested in its contributions. It is true that in the technical schools as in the colleges of engineering there are still men who think of instruction in English in terms of conditions existing thirty years ago. Often their ideas are amusingly naïve. To some of them rhetoric is little more than grammar and punctuation. On the whole, however, in spite of the fact that their backgrounds are occasionally provincial, they are as open minded as their colleagues in other fields. One of the chief problems confronting teachers of English is the education of their associates. It is their duty—a duty which the latter have a right to expect of them—to keep constantly before them the latest developments in their subject and to urge the adoption of those that seem likely to be of value. If they have learned tact as well as persistence, they need not be afraid of the result. In this connection, although I did not intend to mention the matter, I owe a word of appreciation to the members of the boards of trustees who, in all the technical schools with which

I am familiar, have been foremost in insisting upon the value of the humanities. They have, to my knowledge, never failed to support proposals that enhance the position of English. For them, therefore, as for their colleagues in engineering, teachers of English ought to act as guides and counsellors. If they have any capacity for leadership, they will find ample opportunity to display it.

Because of these changes the problem of securing the proper type of instructor in English is no longer perplexing, except insofar as it is difficult at any time to find teachers who from the point of view of personality and preparation are likely to be successful. I hold firmly to the opinion that good teachers of English anywhere will be good teachers of English in technical schools. Fortunately it is now possible to secure them. Although ten years ago few young men of promise willingly turned to such institutions, to-day they are as ready to enter them as the academic colleges of the East. Some of the reasons I have already suggested. To begin with, the subject has acquired a dignified position on the campus. Work, too, is usually carried on under pleasant conditions. Above all, instructors coming from graduate schools or from arts colleges find themselves in friendly association with a group of men in allied fields. They no longer feel themselves aliens but members of a fellowship with a distinct tradition.

Furthermore, the range of work is now such that, except to the æsthete or the pedant, the technical schools offer as rich an opportunity for service as any other type of institution. Most important is the fact that instructors can turn easily from one type to the other. If the technical schools have drawn teachers from the staffs of many colleges and universities, they have also sent to them in return many teachers of distinction. At the present time a considerable number of men who were instructors or assistant professors are full professors or heads of departments elsewhere. If competent instructors are to be secured, the heads of the departments of English must henceforth assume some responsibility for their advancement. This is one of the problems which I commend to your consideration.

It raises at once the degree of preparation demanded of instructors. At Rensselaer we have followed the policy of appointing only men who have one or two years of graduate work to their credit. The average, I think, is about two years. Although I know that some of you feel that graduate work is likely to destroy a man's usefulness, I find myself unable to agree. Doubtless it is true that the experience of the graduate school, with its emphasis upon scholarship for its own sake and its disregard of the technique of teaching, does ruin many mediocre students. On the other hand good men with initiative and a sense of proportion, with a taste for

life as well as for literature, not only survive but actually come out with a richer and more valuable background. We ought to insist that our teachers be at least familiar with the canon. There is another reason for this insistence. Advancement still depends to a large extent upon scholarly achievement. If heads of departments are to assume any responsibility for the instructors under them, they must be able to count upon a foundation which will make success possible. Under any circumstances, it is their duty to encourage the members of their staffs to engage in undertakings which will enlarge their horizon and increase their usefulness. To this end they ought to take whatever steps are necessary to provide them with the necessary facilities, to secure for them whatever books they need, and to introduce them to editors, publishers, and others whose acquaintance may be of value to them. All these are matters of the utmost importance in solving the administrative problems connected with the teaching of English in technical schools.

Their solution will go far toward obtaining the respect and cooperation of the students, in whom, after all, we are primarily interested. The developments which I have mentioned have cleared the road of many obstacles. The unity of the technical schools makes English seem as essential a part of the curriculum as any other subject. Already there has grown up a tradition into which undergraduates are drawn in spite of themselves. The association of the humanities which I have described has added materially to their prestige. When they are grouped in a department with a high morale and have the support not only of the faculty in general but also of the board of trustees, the position of the teachers of English is fortunate indeed. Under no other circumstances is the standard of attainment among students likely to be so high. So far as they are concerned the most important duty of heads of departments is to find instructors with imagination enough to appreciate the significance of what they are asked to do and to obtain for them the advantages which I have tried to outline. They will not pass unnoticed upon the campus.

In discussing the same problems from the point of view of the colleges of engineering, I can, as I have said, speak with less immediate authority. On the other hand, I have talked with many heads of departments and through a dozen or so invitations which have come to me to join the faculties of other institutions I have been led to explore the administrative difficulties by which they have been perplexed. Hence I do not feel myself an entirely incompetent critic. Nevertheless I regard as tentative any ideas that I may advance regarding the organization of departments of English, the character of their instructors, the attitude of their colleagues, and the reaction of their students. You may consider them merely as starting points for this discussion.

I need hardly remind you that the relation of the departments of English to the colleges of engineering is ordinarily different from that which exists in the technical schools. Except in a few instances, as at the University of Michigan and I assume at the University of Colorado, departments of English are entirely independent. Indeed, I am not certain that even under such circumstances those in charge of the courses provided are absolutely free from administrative interference, or recognized as full members of the faculties of engineering. Nevertheless, in spite of the fact that the departments of English in the universities are still nominally responsible in most cases for appointments and promotions, the arrangement seems to have been successful. Even where members of the staff have merely been given jurisdiction over the work in the colleges of engineering, conditions have steadily improved. I am convinced that in the solution of this particular aspect of our problem freedom from departmental control and recognition by the colleges of engineering are both important. One of the most useful moves which this Society could undertake would be to advocate the necessity of such freedom and recognition; and one of the most compelling duties of teachers of English is to make clear that necessity to their colleagues and, as they have opportunity, to the members of the governing boards of the institutions with which they are connected.

Until this principle is established, I see little hope of providing adequately for the teaching of English in colleges of engineering. The obstacles are obvious. In the first place—and I am going to be perfectly frank—many heads of departments are not interested in their students. To them they are merely nuisances. Only a short time ago the dean of one of the largest colleges of engineering complained to me that he could secure no coöperation from the head of the department of English, who refused point-blank to offer the kind of courses which he had proposed. A short time ago, also, a friend of mine who is head of the department of English in one of the large state universities remarked to me that, although he believed in the theory of combining in freshman sections students from different groups, he was always fearful lest the engineers should "contaminate" the others. Under such circumstances the lot of the teachers in charge of the courses in English in many colleges of engineering is not exactly enviable.

Unfortunately they are often hampered not only by the attitude of their heads, who are at best indifferent, but also by that of their colleagues in engineering. As I have already said in connection with the technical schools, most faculty members are inclined to emphasize the importance of English. Many, however, think of the subject only in the most utilitarian terms. Not all of them realize that ability to write effectively depends upon the cultiva-

tion of imagination and taste. Consequently they are inclined to look askance at the introduction of courses likely to contribute to these ends,—a fact pointed out recently in the JOURNAL of this Society. Some, like the dean of a large college of engineering with whom I have occasionally been associated, seem unaware that appreciation of literature requires something more than skill to read the words of which it is wrought. For this reason, if for no other, teachers of English need to establish the most intimate relations with their colleagues in engineering.

All of this has a direct bearing upon the recruiting of instructors. It has always been easy to secure instructors of a type in the larger universities which provide facilities for graduate work. Everyone knows, however, that much of the teaching done by them is perfunctory. It is especially perfunctory when they are assigned to students drawn from the colleges of engineering. Indeed, until recently the youngest and most inexperienced instructors were usually given this ungrateful task. From it they escaped as soon as possible either because their interests attracted them elsewhere or because they recognized that advancement lies in another direction. Few will deny that the atmosphere of most departments of English adds to the difficulties of the teachers in charge of courses in the colleges of engineering. Nor does the attitude of instructors in engineering always balance the scales. At any rate many promising men are rebuffed and lost to the profession.

I need hardly add that such conditions react strongly upon the students in the colleges of engineering. Theoretically they should profit from the variety of courses available in the larger universities. Too often, however, they feel themselves in an alien environment and if they do not develop a spirit of antagonism, they tend to suffer from a sense of inferiority. Increasingly they come to look upon all studies outside their special fields as "side shows" of little importance and in defense fall back upon a kind of "hard-boiled" bravado. For this condition the only cure is a centralizing policy which will make the colleges of engineering administrative units in which the teaching of English and those who teach it will be given positions that compel respect.

Undergraduates are quick to weigh the estimates of others. They soon sense the attitude of their instructors. Above all they are alert to the gradations of rank. Students who find the teaching of English in colleges of engineering entrusted to those who obviously are not regarded as of first importance cannot be blamed if they come to the conclusion that the subject itself ought to be regarded in the same light. You will, I know, ask me how, in view of the situation which I have pictured, it is possible to induce men of outstanding ability to devote themselves to the teaching of

English in colleges of engineering. The answer to that question is simple enough. All that is necessary is to give them authority, rank, and the rewards that ordinarily accompany them. If once this is done, we shall hear less about the problems of administering English work in technical schools and colleges of engineering.

And so I come to the last point which I wish to make. After all, institutions get about what they pay for. "As a rule," so runs a paragraph in the catalogue of the California Institute of Technology, "professional studies monopolize nearly all the available . . . money, leaving the humanities to take what is left, which usually turns out to be very little." This is the truth. Until the technical schools and colleges of engineering are prepared to pay to teachers of English salaries comparable to those paid to teachers in other departments, it is futile to talk about the other problems which I have mentioned. When they are prepared to pay such salaries—and only a few institutions now do so—there will be little need for a conference of this kind. In administering English work in engineering colleges, the chief need is an appropriation in keeping with the importance of the subject. Everything else will follow as a matter of course.

LUCK AND EXAMINATION GRADES

By CHESLEY POSEY

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There is much difference of opinion among teachers as to the value of final examinations. Some teachers base the grade given in a course entirely upon their impression of the student's work. They are distrustful of the examination as a reliable measure of the student's grasp of the subject matter. At the other extreme, some feel that their judgment may be prejudiced, and try to avoid being unfair by placing sole reliance upon a written examination.

If the examination is to be used as the main basis for comparing the members of the class the teacher should exercise great care in selecting representative questions and stating them so as to insure that all will have an equal chance. No matter how well he does this task, however, the element of luck will impose a limit to the accuracy he can hope to obtain. This is because the teacher cannot ask all that he expects the students to know, but must confine himself to a comparatively few questions. The following is an attempt to evaluate the limiting effect of the element of chance.

Let us assume that we have 100 students who have mastered 90 per cent of the material they should have covered in a certain course. If we give them an examination consisting of only one question, there are only two possible grades, 100 per cent and zero. According to the law of probabilities, we should expect about 90 of the 100 students to get 100 per cent and about 10 to get zero. Suppose now that we give an examination consisting of two questions. There are now three possible grades: 100 per cent, 50 per cent, and zero. The terms of the binomial expansion,

$$100(.9 + .1)^2 = 81 + 18 + 1,$$

give the theoretical numbers that should fall in each group, 81 getting 100 per cent, 18 getting 50 per cent, and 1 getting zero. The actual proportions falling into each group would not necessarily equal these theoretical proportions in any particular trial, but over a large number of trials they would closely approach the theoretical proportions. The 90 per cent student taking a two question examination has 81 chances in a hundred of making 100 per cent, 18 chances in a hundred of making 50 per cent and 1 chance in a hundred of making zero. Notice that the two question examination

is incapable of disclosing that there is such a thing as a 90 per cent student. It might seem that all that it is necessary to do is to give enough questions so that a grade of 90 per cent is possible, but we shall find that this does not completely solve the problem; there will still remain uncertainty due to the element of chance.

Before we extend our computations to include cases with a greater number of questions, let us define the terms we shall use and examine the assumptions underlying the method used. A 90 per cent student is one who has learned 90 per cent of what he should have learned in the course. We are attempting to evaluate our chance of finding out that he is a 90 per cent student. A "question" is the smallest unit to which a grade is given. Thus an examination might have ten subdivisions, but if each subdivision or question in the ordinary sense contains ten units the examination has 100 "questions" according to our definition. We shall use the binomial expansion,

$$P_m = \frac{N}{m!(N-m)!} \times .9^m \times .1^{(N-m)},$$

where P_m represents the probability of getting a grade of m per cent on an examination of N questions.

Perhaps the most questionable assumption involved in using the binomial expansion is that the number of questions asked will be very small in comparison to the total number that the student is expected to know. The error due to this assumption will be small for the examination with only ten or twenty unit questions. It is more apt to be significant for the examination with 100 questions. The distribution or spread of grades obtained using this assumption will be greater than that obtained under an assumption of a limited number of possible questions not great in proportion to the number of questions asked on the examination. This means that the true contrast in accuracy between the ten question examination and the hundred question examination will be greater than what we shall obtain under our assumption.

Another assumption involved is that the sampling is random. While it is not true that the questions are chosen at random it is true that the gaps in the student's knowledge are very likely to be random gaps. We also assume that the questions are of such a type that the right answer cannot be guessed at successfully.

Figure 1 shows graphically the results of the computations made. The probability of getting a grade of a certain per cent is the ordinate of the plotted point. There are no values at intermediate percentages; the curves are drawn connecting the points merely to distinguish between those belonging to the 50 per cent

student, the 70 per cent student, or the 90 per cent student. These charts give an idea of the magnitude of the gain in accuracy from increasing the number of unit questions to 100. They also reveal an interesting fact; that the spread is greater for the poorer stu-

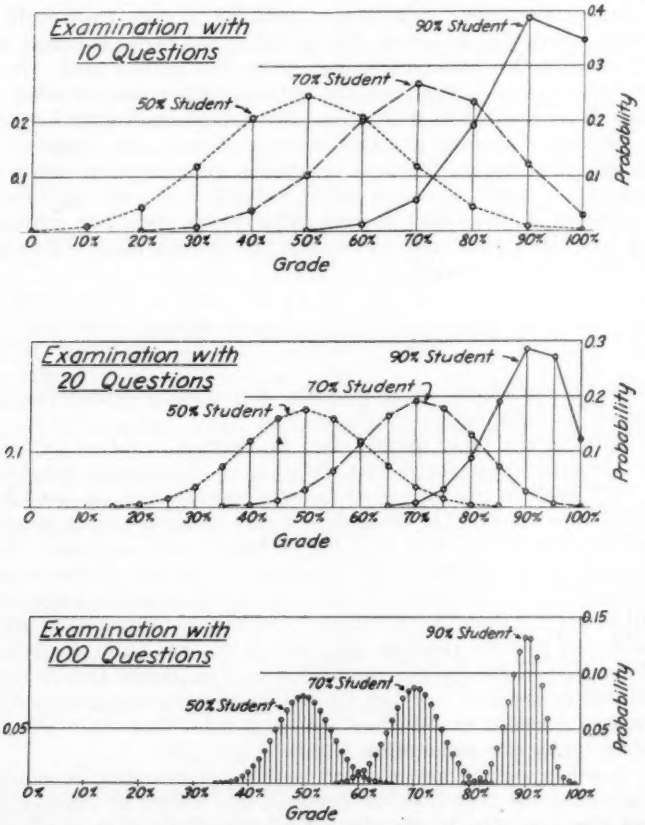


FIG. 1. Charts showing probabilities that a student whose knowledge of a subject is 50 per cent, 70 per cent or 90 per cent will get various grades on 10, 20, or 100-question examinations.

dents. This bears out the observation made in practice when poor students are allowed to take another examination: if enough special examinations are given the student will finally be lucky enough to make a passing grade.

A numerical measure of the spread of a distribution such as those in Fig. 1 is the probable error. The following table shows the probable errors for each of the curves of Fig. 1.

PROBABLE ERROR IN GRADE

No. of Questions	50 Per cent Student	70 Per cent Student	90 Per cent Student
10 Questions	10.7%	9.8%	6.4%
20	7.6	6.9	4.6
100	3.4	3.1	2.0

The figure of 2.0 per cent for the 90 per cent student on a 100 question examination means that half of a large number of 90 per cent students may be expected to get between 88 per cent and 92 per cent. It is of interest to note that if the 100 question examination is of the true-false type this probable error increases to 2.9 per cent.

The following table summarizes the effect of the element of chance on the grades received by 1,000 students of each type on examinations of 10, 20 or 100 questions:

	Number of Students Receiving Grade of				
	A (95–100)	B (85–95)	C (75–84)	D (70–74)	Fd Below 70
1,000-50% Students					
10-question exam.	1	10	44	117	828
20-question exam.		1	19	37	943
100-question exam.					1,000
1,000-70% Students					
10-question exam.	28	121	233	267	351
20-question exam.	8	99	309	192	392
100-question exam.		1	163	386	450
1,000-90% Students					
10-question exam.	349	387	194	57	13
20-question exam.	392	475	112	9	12
100-question exam.	58	903	39		

Of the thousand 50 per cent students, all of whom should fail, 172 will pass a 10 question examination and 57 will pass a 20 question examination. On the 100 question examination it is pretty certain that all of them will fail.

The 70 per cent student is right on the dividing line. If it were possible to determine his standing exactly he should get a *D*, but on each of the three examinations his chance of failing is large. On a 20 question examination 16 out of every hundred will get a

C, but 45 may be expected to fail. In the gamble for grades the 70 per cent student has the odds against him.

The 90 per cent student stands squarely in the middle of the *B* group, yet on the 10 and 20 question examinations he has almost as good a chance to get an *A*, though he runs a small chance of falling below *B*. On the 100 question examination he stands a good chance of getting the grade he deserves. On the whole, the odds rather favor the 90 per cent student.

Due to the assumptions that it was necessary to make to be able to compute the probabilities mathematically, the results cannot be said to be accurate and exact, but they do give an idea of the magnitude of the variations to be expected, and provide an argument against the fraction of a per cent grading system that some teachers use.

SOLID GEOMETRY—AN ENTRANCE REQUIREMENT FOR ENGINEERING UNIVERSITIES

By R. C. RHYNEARSON

Graduate Student, Purdue University, Lafayette, Indiana

High school graduates before being admitted as students in engineering universities are often required to present credentials showing completion of a solid geometry course. In some universities this requirement is strictly adhered to, while in others this subject is not required. It is the purpose of this study to determine the validity of such a requirement and to recommend revisions which are logical.

It has been the practice of Purdue University to permit some students to enter the engineering schools without the solid geometry high school credit. These students are required to pursue the study of this subject in the university classroom. It is these students and their scholastic accomplishments which will be discussed in this paper. The students were grouped as classes entering from 1924 to 1928. It must be borne in mind that these groups are not large, but the results obtained from this study are conclusive enough to permit the drawing of some definite conclusions. In the remainder of this paper, these students who are deficient in solid geometry at entrance will be referred to as solid geometry students; any other classification will be specified. The grades referred to will be those symbols used at Purdue University to represent the following percentage ranges: H, 98–100; A, 90–98; B, 80–90; P, 70–80; C, 50–70; D, 25–50; F, complete failure; and I, incomplete. In some of the classes studied H does not appear, as this grade was not given before 1927.

The first comparison made was between the grades given to the entire university and those in solid geometry. The solid geometry grades were much lower, that is, a smaller percentage of A's and B's and a larger percentage of P's, C's and D's. There are two possible causes for this condition; the low grading scale of the mathematics professors or the subnormal aptitude of the students. The first reason may be discarded as each solid geometry class is taught by a different instructor. Further discussion of corresponding low grades in other subjects will also show the error in this assumption. If the entire class were subnormal, the higher grades would not appear at all, but a small percentage was present. Evidently, there must be some good students in the class to justify the

higher grades. Assuming this to be the case, the class was divided into two groups; those who were graduated, and those who withdrew or were dropped, hereafter referred to as out students.

When the grades received during the freshman year are analyzed on this basis, the graduated students show a larger percentage of the higher grades, while the out section shows a larger percentage of the lower grades. In comparing each section's attainments with the all-university average, the graduated section shows a higher percentage of the passing grades with a lower percentage of the failing grades. The out section, as would be expected, had a lower percentage of higher passing grades, and a higher percentage of the lower passing and failing grades.

The cause for two distinctly different type sections of students both deficient in solid geometry is not known, but it is assumed that the out section students purposely avoided mathematics in high school due to their difficulty with the subject. The graduated students probably did not have the opportunity to study the subject previously.

If solid geometry is to be regarded as an entrance requirement, it must measure something else besides the knowledge within its own field. Since the courses pursued by the freshman engineering students are varied and include such subjects as history, English, foreign languages, shop practice, and military training, a definite relationship should exist between the grades received in these subjects and those received in solid geometry. These grades were correlated for each individual class group: the lowest correlation being .545 with a probable error of .14; the highest being .72 with a probable error of .0635. The low correlation and high probable error was obtained in a small class group. This correlation was the only one in which the probable error was so high as to prohibit the use of the correlation. The highest correlation and low probable error was obtained from the largest class. In all correlations Spearman's "rank difference" method was used, employing the formulæ:

$$\sigma = 1 = \frac{6\sum D^2}{N(N-1)},$$

$$\text{P.E.} = .6745\frac{1-\gamma^2}{\sqrt{N}},$$

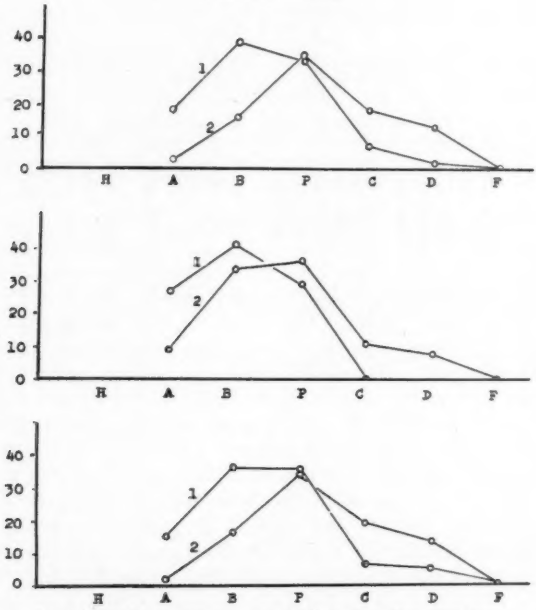
where

γ = the correlation factor,
D = the rank differences,
N = the number of cases,
$\sum$ = the summation.

Entering Class	Percentage of Total Grades								Per Cent Graduated	Average Grade	
	H	A	B	P	C	D	F	I		Solid Geometry	All University
1924											
University average		18	39.5	33	6.3	1.9	.2	.7	50		
Solid geometry		5	5	50	23	17			16.6		
Freshman year		10	36.6	43	10	1.1					
Graduated stud't		14.9	50.6	31.2	3.28					82.57	83.27
Out students		6	25.1	51.4	14.1	3				74.38	79.13
1925											
University average		18.6	38.6	32.2	7.3	2.5	.2	.6			
Solid geometry		13.8	12.3	45.5	12.3	10.5		5.2	10.5		
Freshman year		10.2	32.8	42.3	9.8	4.5	0.34				
Graduated stud't		17.5	44.2	35.2	3.1					82.51	
Out students		8	29.3	43.4	12.1	5.8	.4			73.6	
1926											
University average		19.3	38.1	32.1	7.4	2.4	.2	.5			
Solid geometry		2.7	16.2	35	18.9	13.5	0	1.35	14.9		
Freshman year		15.3	36.6	34	7.9	5.7					
Graduated stud't		27.3	41	29.4	1.0	1					
Out students		9.35	34.5	36.4	11.3	8					
1927											
University average	3.4	20.3	38.4	26.5	6.6	3.4	.2	.6			
Solid geometry		5	25	45.5	20	5			18.4		
Freshman year	2.26	16.7	42.4	25.9	5.5						
Graduated stud't	4.9	37.2	46	12.3	.89					82.63	
Out students	.5	4.5	39	33	8	10.1	.5	.5		74.45	
1928											
University average	3.4	20.3	38.4	26.5	6.6	3.4	.2	.6			
Solid geometry		10	20	60		6.6	3.34				
Freshman year	1.03	11.3	29.6	55	10.5	9.7	1.03	.25			
Graduated stud't		26.7	46.5	23.3	3.3					83.78	
Out students	1.1	10	28.1	37.9	11.1	10.3	1.1	.38		71.87	

These high correlations show that a degree of relationship does exist between the grades obtained in the freshman year and the grade in solid geometry. Since the out students are the ones who obtain the lower grades, it would be desirable not to admit them as students. However, if the solid geometry requirement were strictly adhered to, some of the students who would make grades above the university average would not be admitted. In other words, a reservation must be added to the solid geometry rule.

TYPICAL CURVES



1. University average. 2. Solid geometry grades.

1. Freshman year average of graduated solid geometry students. 2. Freshman year average of out solid geometry students.

1. University average. 2. Freshman year average of all solid geometry students.

To be fair to all applicants for admission it is necessary to study more of the entering student's high school attainments and their relationship to university scholastic records. Dr. H. H. Remmers of Purdue University in his study of the entering class of 1926 (a class included in previous discussion) shows that there is a relationship between the grades made in high school and those

made in the university. A quotation * from this study is as follows:

"An appreciable relationship between the third of the high school class in which these students graduate (as reported by the high school principal) and their success in college is to be noted. Of the 45 per cent of our students whose records show that they came from the upper third of their high school class, 75 per cent are in the upper two grade groups, while only 20 per cent of the lower third obtain this average." As a relationship exists between the high school and university grades, it seems logical to add to the solid geometry requirement "or graduated in the upper third of the high school class." This requirement would keep out the students who were poor high school students if they had not passed the solid geometry course. Of course, this gives the poorer students an opportunity to enter the university by merely passing the solid geometry course but it must be remembered that "Success is only 10 per cent inspiration and 90 per cent perspiration," the students at least showing that they were acquainted with the last part of the statement.

In the above discussion, the differences of high schools have been omitted. In a study of these high school differences by Professors H. H. Remmers and J. L. Stalnaker of Purdue University some of the reflections of the size of the high school and the length of the term in the freshman year grades are shown. The two conclusions of this study † which would affect the solid geometry study are as follows:

First semester freshman average grades show a very slight though significant relationship with the size of high school.

First semester grades also show a tendency to be related to length of high school terms, although the relationship is not clearly statistically significant.

However, these relationships are not great enough to necessitate the setting up of other reservations in the solid geometry requirement, to take care of these differences.

One other question now presents itself, "Should entering students deficient in solid geometry who were graduated in the upper third of their high school classes be compelled to study solid geometry in the university?" It is the general consensus of opinion of the mathematics professors at Purdue University that this knowledge is not essential to the engineering education. This statement seems logical when it is borne in mind that the courses in engineering do not require the thinking in the third dimension until it has been discussed in such courses as descriptive geometry, mathe-

* H. H. Remmers and J. M. Stalnaker, "A Study of the Class Entering Purdue University in 1926," *Studies in Higher Education XVII*, p. 10.

† H. H. Remmers and J. M. Stalnaker, "What Kind of High Schools Contribute to College Failures?" *Studies in Higher Education XIV*, p. 23.

matics, and mechanical drawing. Those having mathematical ability and not having studied solid geometry could pass the engineering courses successfully.

The late John W. Young, Professor of Mathematics, Dartmouth College, proposed the use of trigonometry * as an entrance requirement instead of solid geometry. No doubt trigonometry is more useful to the engineer, but, apparently, secondary schools supplying students to engineering universities are failing to recognize its greater relative value as preparation for advanced mathematics. Then, too, the secondary schools are handicapped in not being adequately supplied with instructors capable of teaching trigonometry properly.

The aim of the secondary school is no longer the supplying of applicants having ideal subjects to offer as entrance requirements to universities, but training students for industrial life, since ninety per cent of their students enter this field. In view of these facts, solid geometry, although not as useful as trigonometry, should remain as the mathematical entrance requirement of engineering schools.

In conclusion, the entrance requirement for engineering universities should be the completion of a solid geometry course or graduation in the upper third of the high school class. Solid geometry should not be studied in the university at the expense of other more profitable courses.

* Young, John W., "The Adjustment between Secondary School and College Work in Mathematics," JOURNAL OF ENGINEERING EDUCATION, March, 1932, p. 588.

NEW MEMBERS

CLYDE, GEORGE D., Professor of Irrigation Engineering, Utah State Agricultural College, Logan, Utah. Ray B. West, H. R. Kepner.

DAVIS, ROLAND P., Dean, School of Engineering, West Virginia University, Morgantown, W. Va. R. A. Seaton, F. L. Bishop.

DURKEE, P. W., Adjunct Professor of Mathematics and Physics, Texas College of Mines and Metallurgy, Ela Paso, Texas. F. L. Bishop, Nell McKenry.

EDWARDS, JESSE B., Professor of Physics, Georgia School of Technology, Atlanta, Ga. J. E. McDaniel, R. S. King.

FLEMING, DAVID W., Instructor in Mechanical Engineering, Texas A. & M. College, College Station, Texas. C. W. Crawford, V. M. Faires.

FOXWELL, WILLIAM H., Lecturer in Mechanical Engineering, University of California, Berkeley, Calif. B. M. Woods, H. B. Langille.

GOTAAS, HAROLD B., Assistant Professor of Civil Engineering, University of South Dakota, Vermillion, S. D. L. E. Akeley, M. W. Davidson.

HARRINGTON, W. FORREST, Assistant Professor of Engineering, Virginia Polytechnic Institute in Norfolk, Va. E. B. Norris, P. T. Norton, Jr.

HERSAM, ERNEST A., Professor of Metallurgy, University of California, Berkeley, Calif. H. B. Langille, B. M. Woods.

HILLEBRAND, WM. ARTHUR, Professor of Electrical Engineering, University of California, Berkeley, Calif. L. F. Fuller, H. B. Langille.

KOHLER, ARTHUR S., Instructor in Chemistry, Newark College of Engineering, Newark, N. J. F. N. Entwisle, J. A. Weishampel.

LEE, EDWIN A., Professor of Education, Director, Division of Vocational Education, University of California, Berkeley, Calif. C. F. Garland, H. B. Langille.

MATHEWSON, EDWARD P., Professor of Administration of Mineral Industry, University of Arizona, Tucson, Ariz. G. M. Butler, J. C. Clark.

MINARIK, RUDOLF G., Associate in Mechanical Engineering, University of California, Berkeley, Calif. L. F. Fuller, H. B. Langille.

MORRISON, GILBERT, Instructor in Civil Engineering, The Cooper Union, New York, N. Y. Geo. F. Bateman, Fred E. Foss.

MORRISON, PETER, Instructor in Industrial Engineering, Ohio State University, Columbus, Ohio. John Younger, E. A. Hitchcock.

PAFFENBARGER, RALPH S., Associate Professor of Engineering Drawing, Ohio State University, Columbus, Ohio. T. E. French, E. A. Hitchcock.

PICKELS, GEORGE W., Professor of Civil Engineering, University of Illinois, Urbana, Ill. W. C. Huntington, H. H. Jordan.

PLETTA, DAN H., Assistant Professor of Applied Mechanics, Virginia Polytechnic Institute, Blacksburg, Va. E. B. Norris, N. W. Conner.

ROTH, CHARLES O., JR., Instructor in Civil Engineering, The Cooper Union, New York City. Geo. F. Bateman, Fred E. Foss.

ROUDEBUSH, R. E., Associate Professor of Mechanical Engineering, Iowa State College, Ames, Iowa. M. P. Cleghorn, R. A. Norman, W. H. Meeker.

TAYLOR, DELOS C., Instructor in Applied Mechanics, Kansas State College, Manhattan, Kansas. E. R. Dawley, R. A. Seaton.

VAN WERT, LELAND R., Lecturer in Metallurgy, Harvard Engineering School, Cambridge, Mass. H. E. Clifford, D. H. McLaughlin.

VOPAT, WILLIAM A., Instructor in Mechanical Engineering, The Cooper Union, New York City. Geo. F. Bateman, H. F. Roemmele.

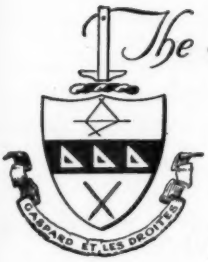
WARD, NAIRNE F., Assistant Professor of Mechanical Engineering, University of California, Berkeley, Calif. H. B. Langille, J. N. LeConte.

WILLIAMS, J. PAUL J., Instructor in Civil Engineering, The Cooper Union, New York City. Geo. F. Bateman, Fred E. Foss.

DUKE UNIVERSITY, Durham, N. Car.

CORRECTION

On page 72 of the October JOURNAL OF ENGINEERING EDUCATION the following correction should be made: "Music hath charms to soothe a savage breast."



The T-SQUARE PAGE

DEVOTED TO THE INTERESTS OF THE DIVISION OF ENGINEERING DRAWING

FREDERIC G. HIGBEE, EDITOR

The Drawing Competition.—Because Union College won first place, the following description of their course will be of interest. "The first course in Engineering Drawing is a four-credit hour course extending through the freshman year. The theory of orthographic projection, with its application to the use of the first and second auxiliary coördinate planes, is the backbone of this course. No long, formal exercises in the technique of lettering and drafting are required, but these essentials are gradually acquired by careful supervision of the drafting room work. The work during the first half of the course is on printed problem sheets, designed to cut down the manual work to an amount consistent with that available. These sheets involve detailed work in making and reading multiple view orthographic drawings. They are quite theoretical and the weak students find them difficult, but the work is an inspiration to those who can do clear, straight thinking. The rest of the course consists of practice in making working drawings, isometric, oblique and perspective drawings, and sketching, with the underlying theory always stressed." Professor Russell A. Hall states, "if our work here has any special merit, it is not due to any part of the subject matter we teach, nor to myself as an individual, but rather to the experience and training which a teacher is able to acquire in a department of drawing which has a long tradition of fine work. There are several schools which have drawing departments with this tradition and I have often thought it would be a fine thing if engineering college administrators could see the advantage to be gained by choosing some of the fine teachers developed in these departments, to take charge of their drawing courses."

From a Teacher of Drawing.—"My thirty years of teaching Freshmen have given more to me than I to the students. I have tried to do for them what their parents would have requested of me, and my endeavors have filled my life with satisfaction. The beginners in your school and mine constitute a group of eager, helpful young fellows filled with ambitions. You, drafting teacher, are the first engineering teacher to make class contact with them, and great is your responsibility."

SECTIONS AND BRANCHES

At the meeting of the **Purdue Branch** on October 20 the enclosed program was given and the following officers were elected for the coming year:

G. V. MUELLER, *President,*
J. W. GEIGER, *Secretary.*

The three meetings held this year have been on the following subjects:

1. English Requirements for Engineers.
2. Purpose of Written Tests.
3. Graduate Study.

The paper entitled "Clarity *vs.* Persuasiveness" by Professor G. S. Wykoff was published in the journal of our Society.

The attendance this year has been good and the discussion lively. We have attempted to arouse discussion by listing provocative questions in our announcements of our coming meetings as illustrated below.

Principal Speaker: DEAN R. G. DUKES.

Leaders of Discussion: PROFESSORS S. C. HOLLISTER, R. N. SHREVE, and H. L. SOLBERG.

1. How far may the University properly extend its graduate study?
2. Does graduate study serve effectively as a stimulus to undergraduate instruction? Is this advantage offset by a corresponding withdrawal of time, money, and energy from undergraduate study?
3. May the graduate assistant be trusted with responsibilities greater than the grading of papers? From the standpoint of undergraduate study, is he a useful member of the staff or is he a liability?
4. Does the development of a large graduate school enhance the prestige of a university like Purdue which already has an outstanding position in the undergraduate field?

These and other questions pertaining to graduate instruction were discussed.

W. E. HOWLAND,
Retiring Secretary.

BOOK REVIEWS

Communication Engineering. By W. L. Everitt. McGraw Hill. 567 pages. Price $5.00.

Classification of Impedance Elements,
Networks Using Linear Bilateral Impedances,
Networks Using Non-Linear Impedances,
Networks Using Unilateral Impedances,
Negative Resistance Effects,
Coupling Between Electrical and Mechanical Circuits,
Coupling Between Electrical Circuits and Free Space,
Electrical Measurements.

The author assumes a facility in the use of Mathematics through calculus and any additional mathematics is introduced just before it is applied. Throughout the entire volume the mathematical analysis of the various circuits and pieces of equipment is very complete, and in many cases—especially of vacuum tubes—a Vector diagram is also included.

The problems at the end of the chapters are illustrative of the material covered in the text and for the most part are very illustrative and complete.

This book is so divided that it may be used as an undergraduate course in Telephone Communication or a course in Radio Communication, also the last chapter on Measurements may be used for a laboratory course. It should find application for those students who are well grounded in Mathematics and want a thorough course in communication.

P. E. R.

Advanced Mechanics of Materials. By Fred B. Seely, M.S., Prof. of Theo. Mech. and Applied Mech., University of Illinois. John Wiley & Sons. 325 pages. Price $5.00.

The contents of this text is excellent material as a follow up to the usual undergraduate course in Mechanics of Materials.

Among other things it considers the following, which are of importance in certain types of engineering work, limitations unsolved in flexure and torsional formulas, thick-walled cylinders, unsymmetrical bending, local stresses and statically indeterminate stresses, the last named being an introduction to statically indeterminate stresses by the use of the method of virtual work and elastic energy. An excellent text, worthy of consideration by all interested in the subject Mechanics of Materials.

R. F. E.

Dynamics of Engine and Shaft. By RALPH E. ROOT. Wiley, 1932. 184 pages. Price $3.00.

In this volume the author presents methods of determining the forces operating in various types of reciprocating engines and the effect of these forces on turning moments and bearing pressures, and in producing transverse and torsional vibrations. The problem of balance is elaborately discussed.

Straight line engines, engines with cylinders in two or more banks, radial and rotary types are considered. The effect of offset and of connecting rod assemblies in modifying the forces is thoroughly studied.

The treatment is almost entirely analytical. The periodic character of the forces is emphasized, and the Fourier series is made the basis of nearly all the solutions presented.

The work is scholarly, logical and well arranged. Anyone making a careful study of the book will be well repaid for doing so. The reviewer ventures the opinion, however, that more attention might properly be given to graphical methods of solution, and that in some cases the basic assumptions are not sufficiently exact to warrant the use of so many terms of the Fourier series as the author has seen fit to retain.

J. A. D.

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